RAILROAD GAZETTE

FRIDAY, NOVEMBER 7, 1902.

CONTENTS

ILLUSTRATED:
The Fritz Dinner ... 847
The New Shops of the Atchison, Topeka & Santa Fe, With an Inset ... 850
Good Practice in the Use of Distant Signals ... 852
The Wabash Station at Pittsburgh ... 854
Heavy Pacific Type Locomotives for the Chicago & Alton ... 855
The Smith Metallic Packing ... 856
The Hicks Car and Locomotive Works ... 856
CONTRIBUTIONS:
Valve Gear of the De Glehn Compound ... 847
EDITORIAL:
Man's Natural Right to Have Anthracite Coal ... 858
September Accidents ... 858
Editorial Notes ... 859
New Publications ... 859
Trade Catalogues ... 859
MISCELLANEOUS:
Railway Signaling Club ... 853
The Consolidated Lake Superior Company ... 854
Train Accidents in the United States in September. 855
Unit Costs of Work in Progress ... 859
GENERAL NEWS:
Technical ... 860
The Scrap Heap ... 861
Locomotive Building ... 861
Car Building ... 862
Bridge Building ... 862
Meetings and Announcements ... 863
Personal ... 863
Elections and Appointments ... 863
Railroad Construction ... 863
General Railroad News ... 864

Contributions

Valve Gear of the De Glehn Compound.

Purdue University,
LaFayette, Ind., Oct. 31, 1902.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I have read with interest the communication of Mr. Paul T. Warner in your issue of the 24th, which in part is a criticism of my paper on "Possibilities in American Locomotive Design," published in your issue of the 17th. My statement which is called in question concerns the valve gear of the French balanced compound. The language is "In the working out of this detail, the valves of the inside cylinders are generally run by means of link motion, and the valves of the cylinders outside by means of a radial motion. This arrangement provides for four eccentrics between the frames as in American practice," etc. Concerning this statement, Mr. Warner writes "As a matter of fact, the Walschaert motion is used on both sets of valves, the only difference being that those for the outside cylinders are driven from an arm on the rear crank pin, while for the inside cylinders, an eccentric is necessarily employed, there being, of course, one on each side between the journal box and the crank disc. Only *two* eccentrics are used between the frames, not *four* as mentioned in the article referred to."

In reply to this criticism, I would say that the details of valve gearing are not the same upon all of the several French roads using the de Glehn type of compound, and that my statement above quoted was intended to give a brief and extremely general description of the practice as I have understood it. While I may be justly charged with having unduly emphasized the presence of link motion inside of the frames, Mr. Warner is also in error in asserting that such an arrangement is never employed. For example, I have before me a copy of the *Revue Générale des Chemins de Fer* for November, 1894, containing a paper by M. Baudry, describing the four-cylinder compound of the Paris, Lyons & Mediterranean Railroad, in which four eccentrics are shown inside of the frames; also, a set of the general drawings for a locomotive of the same road which drawings are dated November, 1898, showing four eccentrics inside of the frames.

My paper makes no reference to the design of links but the drawings to which I have referred show them to be of the stationary or Gooch type. There are two eccentrics and two eccentric blades for each link, and so far as the conditions controlling the design are concerned, they could have as well been Stephenson links had the designer chosen to use that form. The original de Glehn compound was, however, equipped in the manner described by Mr. Warner.

W. F. M. GOSS.

The Fritz Dinner.

Those who were so fortunate as to be present at the celebration of the seventieth birthday of Mr. John Fritz, at Bethlehem in 1892, will never forget that occasion. It was delightful in its spirit, in the high appreciation of Mr. Fritz as a man and as an engineer, in the great and notable gathering of the leaders in industry and science, and in the evidences of appreciation which poured in upon Mr. Fritz from England and the Continent of Europe, as well as from our own country. Naturally, the man who remembers that occasion will compare with it in his own mind the dinner to Mr. Fritz on Friday night, Oct. 31, in New York, in celebration of his eightieth birthday, which had the added interest that it was also a celebration of the successful founding of the John Fritz medal. Probably, when one has done with the comparison, he will conclude that each was unique and that it would be useless to try to decide which was the more brilliant and imposing.

At the eightieth birthday dinner there were present at least 410 men, perhaps a few more. There were from 125 to 150 ladies present in the boxes. The room in which the dinner was held was admirably suited for such an occasion in its size and proportions and decoration, and all of the arrangements were carried out with quite unusual perfection of detail. The assemblage was representative of all that is best in our country. The editor of an important monthly magazine, who was present, said that he never saw a more intellectual assembly, and he never heard a better lot of speeches. He was astonished that engineers could speak so well. This shows that he was little accustomed to meeting engineers in their hours of ease.

The whole spirit of the occasion was most delightful. The note was set by the famous doings and the lofty and simple and lovable character of the guest of honor, and through all of the speaking ran the feeling of personal affection which Mr. Fritz has inspired in such a remarkable way.

We shall not attempt to give now any sketch of the career of Mr. Fritz, which is well known to most of our readers, but shall give more or less completely the various speeches, which will give an idea of his place in the minds of men qualified to judge.

One very interesting incident of the dinner was the presence of Mr. Charles H. Haswell, who is probably the oldest marine engineer now living and the oldest engineer in active practice. Doubtless the oldest of our readers remember his "Pocket Book" as the beginning of their engineering libraries. The first edition of this was published in 1843, and it is still a standard book. Mr. Haswell, who is now past 93, designed the boilers and engines for the first steam warship of the United States Navy, while Admiral Melville, who was present, is one of the builders of our new navy. Mr. Haswell was received by the company with great enthusiasm, and replied to their greetings with a few very appropriate words, and he stayed until the very end.

Obverse and Reverse of the John Fritz Medal.

Another interesting incident which was entirely unexpected was the receipt of a loving cup sent by Mr. Irving M. Scott, General Manager of the Union Iron Works, of San Francisco, builders of the "Oregon." On this cup are engraved the words, "To John Fritz on his eightieth birthday. The builder of the West greets the genius of the East. The 'Oregon's' performance glorifies the steel of Fritz." On this cup is engraved a map of North America and South America, with the sailing courses and distances of the "Oregon's" famous voyage around the Horn in the Spanish-American war.

Messages of congratulation were received from Mr. Carnegie, in Scotland; Mr. Schwab, in Italy; Mr. George Westinghouse; Mr. Max Meier, manager of the works at Defferdinging; Mr. Hadfield, inventor of manganese steel; Mr. Edward Martin, manager Dowlais Works, who also sent greetings from Winsor Richards and Arthur Keene; from Mr. Greiner, of the John Cockerill Works; Mr. C. P. Sandberg; Mr. Schroedter, of Düsseldorf; Mr. Axel Sahlin, general manager of Millom & Askam furnaces, West Cumberland, England; Mr. Irving M. Scott; Mr. Dredge, editor of London *Engineering*; Mr. P. T. Berg, formerly chief engineer of the Homestead Works, and others.

Until Friday afternoon it was expected that Mr. Abram S. Hewitt would be present, but he found that he would be unable to attend and sent a remarkable letter, which is printed below.

At the speakers' table sat Mr. H. G. Prout, toastmaster, and on his right Mr. John Fritz, Admiral Melville, Mr. S. F. Wellman, Mr. C. F. Scott, Dr. R. W. Raymond and Mr. Oliver Williams; on his left sat Captain R. W. Hunt, Mr. George S. Morison, General Eugene Griffin, Mr. Charles H. Haswell, Mr. Robert Moore, Professor Elihu Thomson, Mr. D. A. Tompkins. Mr. Moore was present as President of the American Society of Civil Engineers and Mr. Scott as President of the American Institute of Electrical Engineers. Mr. Olcott, President of the American Institute of Mining Engineers, had been obliged to sail for Europe on the day of the dinner, and Mr. Reynolds, President of the American Society of Mechanical Engineers, was kept away by illness.

The various toasts and speeches follow:

Introduction—The Medal.

The Toastmaster: We are met here for two principal purposes—first, to celebrate the eightieth birthday of our friend John Fritz and, second, to celebrate the successful founding of the John Fritz Medal. If I might venture to borrow for a moment the thought of the immortal Gettysburg speech I should say that Mr. Fritz himself had anticipated this celebration and made it superfluous by his great and lasting gifts to the happiness and prosperity of mankind and by his simple and dignified and sincere life. It is little that we can add to the estimation in which he is held by those who have known him long and well. It is little that we can add to the glory of his name throughout the civilized world. It is little that we can add to the endurance of that monument which he has built for himself. But we can find pleasure for ourselves in expressing to him here in this public way our admiration and our affection. We can find inspiration and a glow of enthusiasm for our own lives in listening to the words of those who know his work and his character and are qualified to appreciate them. These, I take it are the real reasons why we are here.

The General Committee has directed me to say to you a few words about the John Fritz Medal, its origin, its purpose and its present state. The story is short. Last spring a few friends of John Fritz met to organize a celebration of his eightieth birthday, and then the further thought came that they would establish a memorial in order that future generations might know that the men who had lived in the time of John Fritz had had the sense to appreciate his worth. It was natural that that memorial should take the form of a medal, and then the committee decided that this medal should be given to anyone in the world who might have proved his title to it by achievements in research or in applied science. Then it was decided that this medal should be given by a committee of sixteen to be chosen from the four great national engineering societies of our country. The General Committee believe that this medal, considering its scope and considering the method of award, will be even a more distinguished honor than the Bessemer medal which Mr. Fritz himself is proud to hold. It was decided that the fund for the medal should be raised by subscription, and that each individual subscription should be limited to a small sum in order that many men might share in the honor of contributing to the fund. The committee believes that the John Fritz medal thus established will be, like the olive wreath of the Olympian games in itself a little thing of trifling cost but representing such distinguished achievement that it will always be among the most precious trophies of the man or the woman who gets it. The medal is now secure; the fund is established; the design has been made; the die is made and an album containing the signatures of the subscribers to the fund will be presented now to Mr. Fritz as will the master cast from the artist's mould, by Mr. John Thomson, to whom, more than to any other one man, we are indebted for the idea of this medal.

The Presentation.

Mr. Thomson: We have thought, Mr. Fritz, that it would please you to have a permanent record of the founding of the medal which is to bear your name. I have here an album. It is entitled "The John Fritz Medal." It is dedicated to "John Fritz, Engineer, One of the Principal Founders of America's Iron and Steel Industry." It contains a photograph of yourself, Mr. Fritz; also photographs of the obverse and reverse of the medal, under which is inscribed "To Perpetuate the Memory of John Fritz and His Achievements in Industrial Progress." In addition to the historical data and the rules for the award of the medal, it also contains the names and addresses of the founders and their autographs, some four hundred and eighty-four in all.

In the name of and in behalf of the founders of the John Fritz Medal I have the great pleasure to ask you to accept this album, Mr. Fritz, as a slight testimonial of our admiration and regard, and we would have you believe that we desire no greater honor than to be known as the friends of John Fritz of Bethlehem.

We have also thought, Mr. Fritz, that it would add to your pleasure to announce, especially on this occasion, the name of the recipient of the first medal. The rules adopted relative thereto seem to indicate at this time one name, in that the stipulation is expressly set forth that the award

shall be made to commemorate the most notable scientific and industrial achievement. These plaster plaques were reproduced from the original medal made by the artist, and from these one set of castings in bronze has been made, but no more shall ever be made therefrom, for I shall now destroy these original master patterns.

Mr. Fritz, I am duly authorized and directed by the founders of the John Fritz Medal to make the following official announcement of the award. We ask that you, John Fritz, accept these bronze plaques, the only ones of the kind that will ever be presented as an award, made by and coming directly from the founders, our unanimous finding being that of all the Captains of Industry this medal may most worthily be awarded to you. And we beg to assure you of our abiding faith that the crowning reward of your splendid achievements and character will be the perpetuation of your name, than which there can be no higher ideal for the engineering and industrial captains of the future.

Now, Mr. Fritz, for each and all of the founders I wish you many happy years and growing honors and love of friends.

The guests, on the proposal of the toastmaster, here rose and drank to the health of John Fritz. There were three cheers and calls for "Fritz."

Mr. Fritz's Response.

Dear Friends: I do not know what to say in response to this reception. It is utterly beyond my power to express the things that are in my mind. The only thing that I can say is that I accept this from the four great engineering societies. I am not going to detain you long as you can see.

Standing here my mind is carried back to the days of my youth when I worked on the farm, from sunrise to sunset, barefooted. Then my wildest imagination could not have foreseen this honor.

I appreciate this greeting, and accept it as a token of your esteem; and am truly sensible of the great honor you have thus conferred upon me, which gives rise to sincere joy in my heart, that takes precedence of all other emotions, and I can only say that I thank you from the depths of my heart.

But what have I done to earn this reception? What little I have done has been much overrated, and I am the recipient of honor beyond what I deserve; but I hope that my kind friends will continue to overlook my shortcomings, as I have ever tried to do my best.

I do not now forget the laboring man, and especially the able, brave and noble men who loyally stood by me in times of the severest trials that were encountered during my long connection with the iron and steel industries, and who were ever ready to face any hardship or danger that would in any way tend to prevent success. To these kind and loyal men much credit is due for such success as I have attained. But, alas, the majority of them have gone, the grave has closed over them, but they are not forgotten, and they will ever have a green spot in my memory.

It was my misfortune to start in the world with a meager education. I was born of exemplary parents; my father being a man of high moral character, he fully impressed upon my mind the importance of energy, economy and absolute integrity. My mother was a true, Christian woman and early taught me to read and revere the Holy Bible and to trust in the Supreme Being, and that to respect and obey His laws was a duty which mankind should not disregard.

At this distant day, to my mind, the moral and religious training received from my parents, and their noble example, was the most important training I could possibly have received; and I have ever thought the highest honor I could pay to their memory was to endeavor to follow their noble example. In after years, when overburdened with grave responsibilities which were ever recurring and had to be met, it was then I sorely felt the want of a better education; but, on reflection, I knew my parents had done the best they could, and I was content.

It has always been my good fortune to be blest with many kind and loving friends who have stood by me in the darkest days and were ever ready to give assistance by their wise and sympathetic counsel.

There are times when it is an agreeable servitude to be under obligation to those whom you esteem, and I am deeply sensible of the honor conferred upon me on this occasion, and greatly regret that I have not the command of language to make a fitting acknowledgment to my kind friends who have provided for the "Fritz Medal" and arranged this splendid birthday feast, and to you all for your presence here to-night.

But no words of mine can ever express the full measure of gratitude that I so deeply feel towards you all. And here, my dear friends, I beg to assure you that the uniformly kind and thoughtful attention that you have always shown me will be held in grateful remembrance.

May God, in His infinite mercy, vouchsafe to you all long, useful and happy lives, surrounded by kind and loving friends, is my most fervent desire.

Three cheers for John Fritz were called for by Mr. Martin, and the guests sang "For he's a jolly good fellow."

The Fathers of the Art.

The Toastmaster: A strange thing, isn't it, that John Fritz has so many "kind and loving friends"!

The next toast is "The Fathers of the Art." For at least seven hundred years the Anglo-Saxon peoples have been carrying on their struggle for liberty regulated by law, and in that struggle we on this side of the water have taken a characteristic part. We have gone out and fought our stubborn wars, and then we have gone home and sat down and carried on the still more stubborn conflict with ignorance and folly and ignoble ambition and rapacity. The gentleman who was to have spoken for the Fathers of the Art, in the greatest of our wars, contributed of his money, of his wisdom and his energy, and since that war he has continued to give the same devotion to the long civil struggle that has been going on and all of that time he has walked in parallel lines with Mr. Fritz, for he too is an ironmaster. That is Abram S. Hewitt. Lowell has said that the chief duty of a nation is to produce great men, and in Fritz and Hewitt we can present fine specimens of the product of our nation. Unfortunately, Mr. Hewitt is too delicate to be here to-night, but he has sent a letter which will now be read by Mr. Martin, the chairman of the Dinner Committee.

Mr. Martin said: This letter from the Honorable Abram S. Hewitt is addressed to his friend Mr. E. G. Spilsbury, my associate on the Dinner Committee, and runs thus:

Mr. Hewitt wrote:

"I have been debarred for some time by the limitations of age from assisting at any function which takes place in the evening. I have been trying, however, to make an exception in favor of the complimentary dinner given by his admirers to my old and valued friend, John Fritz; but now that the time has arrived I find I must deny myself the pleasure of personally congratulating him, in the company of his loving friends, upon the attainment of his eightieth birthday in the full possession of his health and faculties, and with the promise of many honorable years to come.

"We have made the journey of life together and, to some extent, upon the same lines of action. It is pleasant to recall that during the half century of our association, at times of competitive struggle, the friendship which has existed between us has never in the slightest degree been disturbed. This happy experience is due, doubtless, to the amiable traits of Mr. Fritz's nature, which, with all its masculine energy, is tempered with the sweetness of the gentler sex. 'Once a friend, always a friend,' will be inscribed upon the record of a career which in some respects is unique among the men of our day and generation.

"I do not intend to indulge myself in recounting any of the interesting details of his long and useful life. This pleasant duty will be performed by others, but I do desire to point out that the life work of John Fritz affords a very conspicuous example of the working of American institutions during the century which has just closed, the most remarkable era of progress in the history of the human race.

"That a boy born in humble life, with no advantages of education or opportunities for position, without influential friends or the favoring accidents of fortune, should be able to advance steadily in usefulness, power and the respect of his fellow men, until by common consent he occupies the first place in the domain of practical industry with which he has been connected, gives conclusive evidence that political institutions which afford free play to individual ambition, industry, ability and strict integrity, are worthy of all loyalty and should be cherished and preserved at all costs and hazards.

"The developments of the twentieth century show that these institutions are in great peril. Their essence is to be found in individual liberty, involving the right of free labor and the acquisition of private property under lawful conditions. When the right of free action shall be suppressed the possibility of a career like that of John Fritz; but now that the time has arrived I find it Socialism, may afford other advantages, but let it not be overlooked that these advantages will be obtained only by the sacrifice of personal freedom, and will arrest the progress of civilization due during the ages that have passed to the substitution of freedom for force.

"John Fritz is a living proof of the results of individual and industrial liberty in a country endowed with boundless resources. In vain shall we seek for a like career in nations or in countries where the individual initiative has been suppressed. The stagnation of China, whose men are physically strong and whose resources are abundant, is in marked contrast with our own land, where heretofore every citizen has been free to employ his labor and his energies in his own way, so long as the rights of others were respected.

"John Fritz, therefore, is to us more than a man whom we love and respect, more than a friend to whom we wish many years of health and happiness: he is an example of the free spirit of American institutions, a beacon light warning the present and coming generations against permitting any invasion of the principle of the liberty of the citizen, which alone has made our beloved country great and free."

Mr. Martin, after reading the letter, proposed three cheers for Mr. Hewitt, which were given.

The Navy.

The Toastmaster: In this wicked world which we inhabit it is very little use to build a nation, such as Mr. Hewitt has suggested, unless we are prepared to keep it with the sword. I am told that in certain newspaper offices war has been abolished and that armies and navies are now refuges for the idle and schools of pride and cruelty. And yet some of my friends of some practical experience assure me that the devil is not yet dead, and that the righteous man must still be prepared to fight for his own. However that may be, this gentleman on my right, whose amiability you have heard expressly dwelt upon, has spent some valuable years of his life in making material for the efficient and complete destruction of his brother man, and in 1898 we were very glad to have some of that material in our ships.

I spoke a moment ago of the Anglo-Saxon struggle for liberty regulated by law. I ought to have said the struggle of those born to speak the English language, for the Scotchmen, who I believe are not Anglo-Saxon, have a certain fine aptitude for fighting and with their broadswords they have helped us to carve out the path toward liberty. I am about to introduce to you a Scotchman. He is, I presume (I am not told so), a descendant of William Wallace himself. He is a sailor and a warrior. He is an explorer who has written his name across the Arctic seas, and he is an engineer who has written his name on the story of our new navy. I have the honor to introduce Rear Admiral George Wallace Melville.

Rear Admiral Melville: Gentlemen, I am called on to respond for the Navy of the United States. The navy of the United States is no mean institution. It is second to none in the world except in tonnage. You will rightly understand that I am pleading for more tonnage—more tonnage, more guns, more armor, more speed. I will divert from the navy, however, for a few minutes and for a very few minutes.

Among us here to-night is our veritable Vulcan, whom we are assembled to honor, the Fire God and Iron King of the great engineering profession—John Fritz.

"Those who labor
The sweaty forge, who edge the crooked scythe,
Bend stubborn steel, and harden gleaming armor,
Acknowledge Vulcan's aid."

Who of us all would not doff the hat and bow the head in honor to this our grand brother of the forge and the mill? . . . Our guest, by his mechanical ability and resourceful enterprise, has done much to force the recognition of engineering as a profession. But the engineer of the hour is not without honor, and we who are here to-night know full well that the praises of John Fritz have been sung again and again, and that his name is grandly linked with the development of the iron and steel industries in this country. . . . "Good Uncle John," as we call him, was born in a hamlet where everybody worked, and in early youth he acquired the habits of industry. It was a community where every one respected the rights of his neighbor, and he grew up with the love of his fellow man as the cardinal precept of his creed. Living in a State that was rich in natural resources and the center of the infant iron industry, he began to comprehend the possibilities of making the United States the granary of the world, and of so improving the manufacture of iron and steel that the product of the western plain could not only be carried cheaply to the manufacturing districts of the Atlantic coast, but even to the remote countries beyond the sea. When we review the lifework of this man, and measure his influence in the molding of the destinies of the industrial world—no wonder that we account him great. He has seen the crude mill and furnace grow, under his very hands, as it were, into the perfectly equipped modern plant—he having been identified with every important improvement that made for increased production in iron. . . . In the naval world he will be regarded, by reason of the part he played in giving us our first armor plant, as one of the few persons without the service who made it possible for the nation to secure on the seas even a greater prestige and influence than it ever possessed before.

It is because dear old Uncle John, during his long and busy life, has stood for integrity, faithfulness and application, and everything of good report and right living, that he has, aside from his mechanical genius, been able to make so good a fight. Our hearts go out to this man, who has done more than his duty—more than his share of the work. His open-heartedness and gentleness of soul win our universal good will and esteem. Those who know him best love him most. . . . I know that Uncle John would dispense with these honors that we would show him to-night; but he, good man, must not forget that we are a little selfish in this matter, because we are proud to be associated with him, and to be able to shine just a little bit by his reflected glory.

I can but repeat the only toast of the evening—Uncle John Fritz, the Fire God and the Iron King, our Vulcan, our great and able leader and, as well, our kind and gentle-hearted brother.

Mr. Charles H. Haswell.

The Toastmaster: This is a remarkable occasion in some unexpected ways. We are honored to-night by the presence of the oldest living marine engineer in the world, the man who designed the engines and boilers of the first steam warship of the United States Navy, and who was the first engineer-in-chief of our navy. I ask you to rise and give three cheers for Mr. Charles Haswell.

Mr. Haswell: Through a long, varied and eventful life I have received some compliments, but I know of none equal to the gracious manner in which you have been pleased to receive my name. And I assure you that I shall cherish it not only in memory, but I shall instruct my children to bear in mind your gracious compliment bestowed on me.

The Army.

The Toastmaster: The engineer and soldier are one type of man, their work is substantially the same. It deals with the properties of matter, with the relations of time, space and force. It develops the same intellectual and moral qualities, quick resource, self-reliance, courage, fortitude and devotion to duty. Joshua, himself a great commander of troops, was a born engineer. If you do not believe it, read the story of the brilliant passage of the Jordan and the story of the blockade of the kings of Makkedah, and I doubt not that he destroyed the walls of Jericho by much the same means that would have been used to-day by the distinguished engineer and soldier who will now speak for the army. I have now the honor to introduce General Eugene Griffin.

General Griffin: The force known as the regular army, existing by the will of Congress annually expressed, does not comprise all that should be properly included in the terms of our toast. The history and traditions of the past; the long record of glorious victories which are inscribed on the blood-stained pages of the book of fame, all belong to the army of the United States. Its battle flags adorn our capitols; its trophied guns our parks and public places. The army includes the unfed, unshod, unpaid, tattered veterans of Valley Forge alike with conquering host which Sherman led through the heart of the Confederacy; it includes the militia of 1812, alike with the grand old army of the Potomac against whose iron front at Gettysburg were broken and scattered the advancing waves of the rebellion; includes the victorious armies which feasted in the halls of the Montezumas, alike with the heroes of San Juan Hill; it includes the knightly troopers of the West, who in years of savage warfare have written a record of bold adventure, of daring achievements and heroic sacrifices, which are but feebly portrayed by the cold brief words accompanying the medals of honor so brilliantly won, so sparingly bestowed. Regulars and volunteers alike, in foreign, domestic and savage warfare, our army has made a record which no criticism can belittle, which no eulogy can enhance. . . . What part have the engineers played in this glorious record? Have our military brothers upheld the reputation of our profession? Let us see. . . . Armistead, the third graduate of the United States Military Academy, commanded an army in the field. . . . and Alexander Macombe was called from his high place as Chief of Engineers to take command of the army of the United States as Major General. But it was in the Civil War that the great opportunity came—after political influence had ceased to be a potent factor and when real merit

was pushing men to the front. . . . Here is a list of twelve army commanders all taken from the Corps of Engineers. . . . Twelve corps commanders were taken from the Corps of Engineers. On the Confederate side there were eleven general officers with big commands and all taken from the Corps of Engineers. And again, as division and brigade commanders, as chiefs of staff and as staff officers, as commanders of engineer and volunteer troops, there were many others whose names would make a much longer list.

Such a glorious record is sufficient evidence that the Corps of Engineers furnished much more than its fair proportion of skilful leaders and able soldiers, and that they well uphold the reputation of the engineering profession. The fact that over 10 per cent. of all of the officers in the Corps of Engineers were killed in battle during the Civil War is the best possible evidence that they knew how to fight.

And it is not alone in practical demonstration of the art and science of war that the engineers of the army have made so good a record. Their work in civil lines bearing upon social and economic conditions have been most important. There came into my possession to-day the manuscript of a most interesting chapter bearing upon this subject. I quote from it as follows:

"The Baltimore & Ohio was the earliest important railroad enterprise undertaken in the United States. S. H. Long, William Howard and Wm. Gibbs McNeill, all officers of engineers, . . . were chosen as a board to select the proper route to the Ohio. Upon the rails definitely located by McNeill, for the first time in America, ran a steam locomotive. Before McNeill resigned in 1837 he had surveyed the summit division of the C. & O. canal, and had acted as chief engineer of seven other railroads from New England to Florida and Alabama. After he resigned, for the remaining 16 years of his life, he acted as chief or consulting engineer upon many railroads and other public enterprises in the United States and Cuba, completing the western railroad of Massachusetts, planning and practically constructing the first large dry docks at the dry docks at the Brooklyn Navy Yard, and acting as President of the Chesapeake & Ohio canal.

"Probably greater than McNeill was his junior, Whistler. . . . In 1835 the Russian Government determined to build a line from St. Petersburg to Moscow. A commission of Russian engineers suggested Major Whistler to take charge of this work and he accepted in 1842. The road and its equipment were planned by him in detail. . . . His report upon the gage to be selected has been pronounced one of the finest models of any engineering document ever written. . . . In building of engines all parts were standardized and interchangeable. Whistler died in 1849. Another graduate of West Point, T. S. Brown, was invited to succeed him. . . . In a hasty inspection of the records I have been able to count 49 graduates who have been chief engineers, and 22 who have been presidents of railroads. Many have acted in these capacities on several railroads, and the list would be long indeed of those who have served as resident or assistant engineers." . . . Now as to our honored guest. We are here to-night to testify our respect, our admiration, our affection for that sturdy engineer, that noble man—John Fritz. He has lived a life which we may well strive to emulate, and made a record we all delight to honor. Longfellow says:

> But age is opportunity no less
> Than youth, though in another dress;
> And as the evening twilight fades away
> The sky is filled with stars
> Invisible by day.

It is my hope and my prayer, it is the hope and prayer of all of us that these stars, even though invisible to us, may shine brightly and serenely upon the pathway of John Fritz until the day comes when the great Archangel sounds the last taps and the lamp of life is extinguished.

Messages of Congratulation.

The Toastmaster: We will now have a few extracts from letters and other messages that have been received, and first I will read a word that has been handed to me. The President of the World's Fair to be held at St. Louis, Governor Francis, who regrets his inability to join with us on this occasion, asks me to announce here the appointment of Mr. John Fritz as Honorary Expert in the Metallurgy of Iron and Steel for the Exposition.

The messages of congratulation will be read by a gentleman who with characteristic modesty has undertaken to conceal his identity, inasmuch as he had the preparation of this printed list. At the risk of interrupting a friendship of twenty years I am going to tell you his name presently. I want now to tell you that we are all very greatly indebted to him for the tremendous amount of energy and devotion and ingenuity which he has put into the preparation of the details of this dinner . . . but I promised to tell you his name—Thomas Commerford Martin.

[The names of those who sent telegrams appear above.]

American Society of Civil Engineers.

The Toastmaster: Ever since men quit fighting with clubs iron has been the great war material, and it is still the real precious metal, because the man who has iron can get coal, and yet the consumption of iron as a material of war is insignificant as compared with its consumption in the arts of peace. Civilization is well measured by the consumption of iron, and in our own country we consume more per capita than any other nation. You may draw your own inference as to our standing in civilization. Of all the iron and steel that we produce it is probable that not more than one-half of one per cent. goes into ships of war, guns, shell and other military material. Practically all of it is consumed in the tools of peace. The gentleman who will speak for the American Society of Civil Engineers, of which he is an honored Past President, has himself, I suppose consumed about one hunderd thousand tons of iron and steel in the bridges which he has built. I have the honor to introduce Mr. George S. Morison.

Mr. Morison: We are here with especial respect to a great ironmaster, and the ironmaster has done more than anybody else to raise the profession of the civil engineer to the rank which it holds to-day. The civil engineer's profession is less than a century old. The civil engineer's work dates from the remotest antiquity. But the work of the civil engineer in the past was confined to other materials than metal. His works were built of timber and his fine works of stone. The ironmaster has added iron and steel. The profession is no longer dependent solely on the laws of compression; it has the laws of tension and of elasticity as well. It has been elevated and raised by these increased powers, and it is the ironmaster who has rendered this possible. To no one does our profession owe such a debt of gratitude as to these men who have given us the material of modern construction.

But it is not only in this way that we would refer to our guest of the evening. The profession of the civil engineer is new as a profession. It has been built up in the last century. The men who built it up and made it what it is were men who not only had to build it, but to make their own precedents and find their own way. They could not be educated, because no man is educated in that which has not yet been done.

If we go back through the history of the world we find in the earliest times that a set of men established the conditions while working with the sword, by personal bravery, by indomitable skill. We find those men classed in all ancient history as heroes. They were the heroes of war, and if they were the right kind of heroes they were the masters in peace. The hero was the man of the earliest times, and after that when we come to a time when intellect rather than prowess began to have its effect, when education was not general but was specialized among a few, we find another set of men of very different order who led people forward by the force of their minds and their intellect, and who were known as the prophets of those days. And coming by, passing after the time of prophesy into the times which we can almost remember ourselves, because we remember the people who were active then, we come to the very class of men who made our country possible, who did the work which Mr. Hewitt has so graphically described and who were the patriots of that time. These three classes of men have made the history of the past. Their work was done practically before our profession began. But in the work of the last century, the time that has made the profession of civil engineering what it is, we have had in that profession a set of men who have perhaps done more than any of the others to render possible the conditions of universal humanity which we see to-day. Those men have been the men who, working without precedent, finding their own way, laying the foundations for the education which the profession in the twentieth century will enjoy, have brought up civil engineering to what it is. You may call them heroes, you may call them prophets, you may call them patriots; they have the best qualities of all three. But I think they can in no way be described better than the men who have done the most to utilize the forces and materials of nature for the best good of our race. They are the pioneers, and the best civil engineers, and among them we can place no one in a higher rank than our guest of to-night.

The American Institute of Mining Engineers.

The Toastmaster: Now we come to the foundation of things. But for the mining engineer we should have no ironmasters. The mining engineer made John Fritz possible; he made Bob Hunt possible; he made Alexander Holley possible. The American Institute of Mining Engineers will be spoken for to-night by a gentlemen who for many years has ably served that institution as its secretary, and who has made a great mark on its history. I mean Dr. Rossiter W. Raymond.

Dr. Raymond: You do well to call upon the Institute of Mining Engineers upon this occasion. The Institute of Mining Engineers was the first technical society in this country to recognize those virtues and merits, that brilliancy, that fidelity, that glorious character in John Fritz which you now at this meeting do. Our society was organized in 1871, and we elected John Fritz in 1872 a member; in 1875 we made him vice-president. I do not blame the Mechanicals for not doing it so early—they were not born. In 1894 we made him our president. The Mechanical Engineers, with commendable imitation of us, elected him a member in 1881 and president in 1895, after we had got through. The Civil Engineers elected him a member in 1893, and, much to their credit, elected him an honorary member in 1899. In that, gentlemen, as in almost every other important step, the progress of the American Institute of Mining Engineers leads the procession. But there is another reason why you do well to couple the name of this honored man with the name of the society which honored him first. The American Institute of Mining Engineers belongs to the class of which John Fritz is an example and a type. . . . The chairman of your committee has just read a long list, from celebrated sources, of congratulatory telegrams. Every single name in that list, except the Japanese name which I could not understand as it was pronounced, is a member of the Institute of Mining Engineers. Last year a collection was made of the so-called Captains of Industry to welcome Prince Henry of Germany. Twenty per cent. of the entire list were members of the Institute of Mining Engineers; of those who were eligible for membership 99 per cent. . . . Let me tell you a little thing that I heard John Fritz say once, and let me sum up the whole matter as to this point with that. Fritz said to me: "When I am going to start a new engine I want a good draughtsman to make the drawings, and I want the patterns to be well made and I want the pieces to be assembled and put together in the shop, and then I want them taken to the mill and I want the machine erected, and then when the boys come to me and say it is all right, I say, Are you sure it is all right? Does everything fit? Is it all according to the drawings? Are all the proportions just right? Well, then, turn on steam and let us see why the thing won't go."

There is another matter in which I claim that John Fritz is a worthy member and a typical member of the Institute of Mining Engineers. In the thirty-one volumes of our transactions, over twenty-five thousand pages octavo, you will not find in the transactions of this really national mine workers' union, you will not find one single line about raising the pay of engineers. You will find a great many pages about raising engineers. You will not find one single plan for shortening a day's work or diminishing the quantity of labor that an honest man gives for his wages. But you will find a great many pages devoted to the problem of increasing and improving the quality of the labor. You will find the spirit of giving more than you get stamped on its pages. You will find that the enemy of that society is not capital but ignorance, that the weapon of that society is not the brutal boycott or the senseless strike or the voluntary idleness, which a certain great authority has recently declared to be the weapon of another society, but industry and knowledge and light. You will find that society recognizing individual manhood. You will find that society rewarding it with its recognition and its praise and not believing in any solidarity of occupation which constitutes a mass without units.

You will find that society entertaining the ideal of manhood that rises not upon the ruined homes and slain bodies of its fellow men, but uplifted on their grateful hands.

You will find that society standing in a solid rank for individual liberty, for individual endeavor, for the man who works over hours, for the man who thinks more of his duties than of his rights, for the man who gives forever and forever more than he gets. And against the glorified picture of another John which has been set before us in these latter days we lift the type of our John—John Fritz, and we match John Fritz's day with John Mitchell's day; that was yesterday; this is to-day, and thank God it is to-morrow and forever.

I pray God that the medal which we have this night installed stand forever for those who shall win and wear it as the name upon it stands to-day for such qualities as these. I pray God that He may grant it—nay, He will grant it, for he is not dead, and American manhood and liberty inspired by him are not dead, and Justice and Truth are the foundations of our national life as they are the foundation of His eternal throne.

A Loving Cup.

The Toastmaster: The stated order of proceeding will now be interrupted by Mr. John C. Kafer, who has something to say.

Mr. Kafer: I am delegated by Mr. Irving M. Scott, of San Francisco, who has sent me this beautiful loving cup to present it to Mr. John Fritz in commemoration of what Mr. Fritz has done for him in his work in building the "Oregon." On this is inscribed the following: "To John Fritz on his eightieth birthday. The builder of the West greets the genius of the East. The 'Oregon's' performance glorifies the steel of Fritz." We have with us here to-night the designer of the machinery of the "Oregon," Rear Admiral Melville. We have Mr. Lewis Nixon, who was the designer of the hull, and Mr. Irving Scott promised to be here, but could not get here, and Mr. Henry Scott was unavoidably detained. . . .

The American Society of Mechanical Engineers.

The Toastmaster: I suppose that no other body of men ever spoiled so much good steel as the mechanical engineers. And I know of no one so well qualified to apologize for them as their honored Past President, whom I shall presently introduce. It is especially fitting that he should speak here, because he was one of the Bessemer boys. In the very infancy of the art he worked under and with John Fritz and George Fritz and that soaring genius, that beautiful spirit, the greatest of them all, Alexander Holley. What a privilege it was to begin one's life work building up a great art in such company! It is my privilege now to introduce to you that highly favored man, Captain Robert W. Hunt.

Captain Hunt: My tongue would have to be palsied if I could not respond to such an introduction. The only thing that makes it embarrassing is that my name should be coupled with those greater ones. But it was, thank God, from the inspiration of them that any success which may have come to me has been my lot to achieve. And serving under John Fritz, could you ask a better pioneer, could you ask a greater, a more inspiring commander? . . .

It happened to be my fate to commence my active career in the iron and steel business at Cambria in 1860, and I went there just one month after Mr. John Fritz had resigned his position as chief engineer and general manager to remove to Bethlehem and there establish the Bethlehem Iron Company. When I went to Cambria I found I entered a house of mourning, and I was greeted with tales of the attributes and the loving kindness and all else that go to make up the character of the "old Man" who had gone away. I found there succeeding him his brother George Fritz, and it was my fate to become and to be to the end of his too quickly ended life his most intimate friend. He died in 1873, and it was through him and by him that I knew and became known by John Fritz. You call him "Uncle John"; I have a right, and I claim it, to get closer because he is near me and it has been my fortune during these many active years to know that I was one of his boys. I regard George Fritz and always did regard him, and I regard his memory to-day as that of the greatest mechanic that I ever knew. And still he thought that (as he called him with the rest) the "old man" was greater than he. But I know that neither one of them ever took a step that he did not consult the other, and each bore to the other the greatest respect for his ability. And later Aleck Holley was let into the family. John Fritz, George Fritz, Alexander L. Holley—think of that combination, gentlemen. They were the pioneers of the Bessemer business in America. And with leaders able assistants had to come. The result—America has led the world.

A peculiarity of Mr. Fritz which you all know is that he has liked hard work, and he also has built better than he really knew. Typically I remember on one occasion he called in a friend to criticize a piece of machinery which he had designed and steam had been turned on and it was running. The only comment that this friend could make was, "Mr. Fritz, don't you think that you have made it unnecessarily strong?" John replied: "Well, if I have, it will never be found out." And he has loved hard work. There was an occasion when there was a breakdown at the Bethlehem Rail Mill, and the mill was stopped. Impatient at the unsuccessful efforts of those who tried to drive the broken casting off the shaft, he seized a sledge and swinging it such blows as only those massive shoulders could deliver, it was soon loosened, but as he put down the sledge at 9 o'clock at night an old employee, a privileged man, an Irishman said: "Now, plaze Mr. Fritz, go home. Sure you have been here since 6 o'clock this morning. Let the boys do the rest but, begob, I don't know why I should ask it of you, because during all these years you have worked time and half time." Looking at him to-night, time and half time don't seem to have hurt, and I will tell you why. His labor has always been on straight lines, no matter what opposed, no matter how others looked.

He has had his troubles, God knows, but his path was the straight one, and he hewed it on those lines to the end.

I think one of the greatest compliments that was ever paid him, and he has been the recipient of many, as you know, and none great enough, was . . . when John W. Gates, through his revenge against Andrew Carnegie, precipitated the discussion in the Committee of Congress on the affairs of our nation as to whether or no we were paying too much money for the armor for our ships. They turned to Mr. Fritz to give them the figures of proper cost of production, and give them the design of a plant if the Government desired to build one or decided to build one, and the cost of the plant, and then the Secretary of the Navy, in introducing him to the Congressional Committee, said: "Gentlemen, I present to you Mr. John Fritz, the most honest man I have ever known." And the result of Mr. Fritz's figures and their confidence in them saved our nation from making the great mistake of entering into that manufacture.

Gentlemen, from all you have heard to-night, and from all we know, his talents, his integrity have conquered the respect of the world. Years ago his loving kindness and he himself made him the crowned king of our hearts. Long live the king!

The Valley and the Neighbors.

The Toastmaster: In some sense John Fritz belongs to the world. That you have heard over and over again to-night. But if you would know the real man, if you would know him in his gentleness and in his strength, if you would know him in his wisdom and in his sympathy, you must go into the valley where he lives and among the neighbors who dwell around him. "The Valley and the Neighbors" will be spoken for to-night by one of Mr. Fritz's old and trusted friends, Mr. Oliver Williams.

Mr. Williams: Seventy-five years ago the valley was practically an unknown district. At the upper end a few cranks were endeavoring to persuade their neighbors that the black stones that were outcropping all around them could be burned, but with very little success. Thirty years afterward, by the course of evolution, these black stones became black diamonds, the cranks became coal operators. Twenty years later, through the same evolution, the operators became coal barons. I did not know until a few weeks ago how they obtained this name, and it was only when I went to John Markle, Dr. Wentz and George McCrary and half a dozen more, with tears in my eyes, to beg for a carload of coal and couldn't get it, that I found out why each one of them was called a coal baron. . . .

It is about forty years ago that John Fritz invaded that valley. He came from the rural districts and took possession of our land. It was a scene of bucolic innocence when he came there. I don't think I am prejudiced, but with determined earnestness I want to tell you that the people of that valley—and it is a great thing to be known as the Valley, without any prefix to it—the people of that district were distinguished for their amiability, their beauteous persons, their courteous manners, their dignity, their earnestness, their firmness, their generosity, their—well, I can go through the alphabet, but I won't. I don't mean to say that all the people had all these virtues combined in them. There were only two really that had all these virtues. I would say that one was John Fritz. . . . The other I cannot, of course, mention. . . .

It is with the deepest feeling that I speak to you to-night for a moment of the love and esteem in which we hold this man in the Valley. . . . In the palmy days of Venice they had a book that was called the Golden Book, and in that book were written the great deeds of those men that had acted worthily toward the Great Republic. The Golden Book of the Lehigh Valley is the hearts of the neighbors of this man, and first and foremost in their hearts is written the name of John Fritz.

The American Institute of Electrical Engineers.

The Toastmaster: A very few years ago there appeared upon this planet a set of men who now threaten to drive us all out of business. They deal with a body of facts of which we who have gray hair know almost nothing. They speak a language to which we listen without understanding. They are changing the mechanic arts and they are changing the whole face of society, and they are doing that by an agency which they themselves cannot explain or define. Of course I mean the electrical engineers. The Institute of Electrical Engineers, the youngest of our engineering societies and already one of the strongest, is represented here to-night by a pioneer in the art, one of their Past Presidents, Prof. Elihu Thomson.

Prof. Thomson: It is a great pleasure on this inspiring occasion to join in the homage to our honored guest, John Fritz. We represent, as your toastmaster has said, the youngest development in engineering. One of the speakers preceding me said that America leads the world in certain directions. In what direction did America lead the world first? Why, in electrical work, in electrical engineering. These successes that have followed were the natural outgrowth of the grand development that was going on among our industries. . . . When this electrical engineering industry first began, our honored guest, John Fritz, the man for whom we are gathered here to show our respect and admiration, was an old man, relatively speaking. Less than twenty years ago electrical engineering did not exist. Not much more than seventeen or eighteen years ago a band of a few enthusiasts gathered together and called themselves The American Institute of Electrical Engineers. As the art grew, the Institute grew. It has kept pace with that enormous growth and development which now keeps us all so busy. And what is that enormous growth based upon? Why, it leads back to the ironmaster. . . . We have in the short time of the life of this American Institute which I have the honor to represent, revolutionized lighting, we have revolutionized power, we have revolutionized the chemical industries to a large extent, and are bound to revolutionize them much more than has yet been done. We can almost see our way clear to the giving a candle power of light for say a quarter of a watt, or 1,500 candle power to a horse power—not the 2,000 candle power arc light that you have all heard of that only measures three or four or five hundred actually, but 1,500 real candle power. We can possibly see that ahead of us as the production of a single horse power of energy spent in illumination. And we have given you not only one kind of light, but half a dozen different kinds of light, and those half a dozen different kinds of light having their own special field. But that is not all.

We have revolutionized to a certain extent the railroad systems, and we are bound to revolutionize in time those great systems that extend over the country for hundreds of miles. From the electric furnace we have produced the best abrasives, the hardest substances, and we have even produced the diamond. At the same time we have furnaces that have produced not the grittiest and hardest of substances, but almost the softest of solids, which will flow under pressure like liquid—an artificial graphite. We have given you aluminum, the lightest of metals, with alloys which make it almost as common as brass and cheaper bulk for bulk. And this development will be followed by many others in the electro-chemical field. There is even a promise that we may be able to attack on a commercial scale the elements of the atmosphere, nitrogen and oxygen, and unite them commercially and produce nitrates for use in fertilization of lands. I say this advisedly. Lord Rayleigh, some years ago, made a calculation in which he showed that it was a likely thing that commercial nitrates could be produced, and the attempt is now being made in Niagara to follow out that development, and there is great hope of success. Within a few years we have had a most surprising development in the way of transmission of signals for long distances. We have, as it were, seized upon the whole ether surrounding the world and made it the means of communication. . . . We have taken the salt water surface of the ocean and made it our conducting wire, and we have sent that electricity across the surface to reach that distant point, and picked up energy at the other end, and curiously enough if we raise the frequency of our vibrations of electricity we do not need a return circuit; the energy then goes but does not return. . . .

In closing I would say I know I voice the sentiments of every one of the body of American Electrical Engineers in doing honor—I stand as the representative of each and every one of them in doing honor—to our guest, John Fritz.

John Fritz's Old Boys.

The Toastmaster: Bob Hunt has told us of the fame of Bethlehem rails and billets and armor plate and shafting, but to my mind the greatest product of Bethlehem is men. Bethlehem men were bred under John Fritz, and under him they learned not only their business as engineers, but they learned those things which lie at the very foundation of society. They learned thoroughness and justice and loyalty and fidelity and devotion to duty, and then they went out to carry Fritz's ideas over the country. The gentleman who will speak to-night of John Fritz's Old Boys is one of those old boys, and he carried Fritz's ideas into the building up of the New South. He is not only an engineer, but a business man; he is not only a politician, but a patriotic citizen, and I take uncommon pleasure in introducing to you Mr. Daniel A. Tompkins, of Charlotte, N. C.

Mr. Tompkins: I do not know why the chairman should add to my handicap. I am already handicapped with being a provincial before a metropolitan audience, and perhaps an overfed and sleepy metropolitan audience. I am handicapped in many respects because I came here with a speech prepared to tell how well educated a man John Fritz was, and Abram Hewitt's letter and Mr. Fritz's speech knocked that speech of mine into a cocked hat. Mr. Hewitt said he was not educated at all. Mr. Fritz said he started this life with a scant education. Well, what did we all do? . . .

To a lady who asked what John Fritz had done I said: "He has advanced the material development of this country. He has improved the processes of steel and iron manufacture until these in America surpass what is to be found in any other part of the world. He has improved the manufacture of ordnance forgings and armor plates until the chances of war are materially decreased, and then he and I built the Bethlehem Iron Works." This lady looked rather quizzical and said, "How much did he build, and how much did you build?" "Well," I said, "I see your innuendo. Come back and I will prove by the gentleman himself that what I said is all right." . . . The result of the interview was that he said: "There are about five thousand other fellows who have exactly the same right to claim to be partners in the Bethlehem works as Dan Tompkins has." That gives me a text, a text for the occasion. Five thousand people sent out from the Bethlehem Iron Works to undertake the industrial development of this country! I leave out myself and make it 4,999. I do not believe that the very greatest works of Mr. John Fritz have been in the improvement of the iron and the steel industry. I do not believe that his greatest work has been accomplished when he has been called into counsel by kings and emperors to tell them what to do; I do not believe that his greatest work has been in constructing the Bethlehem Iron Works, but rather in training those 4,999 fellows to go out and preach his creed of thrift, economy, industry and financial and industrial courage throughout these United States, and to make the wheels turn and to establish payrolls for the benefit of the population from the St. Lawrence to the Rio Grande. I am one who believes that what he has done at Bethlehem is comparatively insignificant with what he has done to educate the people of this country in lines that are practical; that preparing men actually to do things is greater than any of the physical accomplishments that he has ever performed in the Valley of which Mr. Williams has told us.

Now, I will tell you another thing, and I am going to say something disagreeable to the audience, but not to him. I believe he will back me up. You have been praising him too much. He did not do everything you said he did. There is somebody at the other end of this hall that is entitled to half the praise. I have known many a woman who could have kept him from doing anything. I make my obeisance to Mrs. Fritz, and I say that the fruits of your work are here before you. He has not accomplished his work without trials and tribulations. He has known what it is to work on in the presence of ignoble prejudice, to work on in the presence of disloyalty. He has known the usual troubles of the man about whom you have all heard, who, when he was told he ought to meet misfortunes bravely, said, "Yes, that is it. I can meet them, but my misfortunes were always going my way." Some of his have been going his way, and I am one of them. And there are other fellows here to-night who were one of them, too. I could call their names, but a fellow winks at me over there not to. One of his greatest achievements is that in the presence of ignoble prejudice, of covetous jealousy, of disloyalty and of other meaner passions he has been able to keep his mind upon his duty before him and to ignore these things which the rest of us are generally not able to ignore. We will stop, leave our duty lying in the dust and go into controversy about the question of advancement, of credit, of promotion and emoluments, which I can swear he never did. This is not the only difficulty he has had to contend with. He has got a difficulty here to-night which would be too much for me. He has had for the service he has done honors laid at his feet which would have turned the head of any ordinary man. I have given him trouble enough myself to have turned thea head of any ordinary man. And then when you remember there are 4,999 others of us—what ought to have happened to him? But in the presence of honors, in the councils of European peoples, telling them what to do, in the presence of a tribute like this to-night laid at his feet, he preserves the same extraordinary amiability, sweetness of character, lovability of disposition which he has possessed from the time I first knew him. Now a man that can stand up in the presence of ignoble prejudice, of unworthy motives and give his whole attention to his duty, and nothing but his duty, is a great man. The man that can have praise and honor and an occasion like this and not lose his head is a great man. His life from beginning to end has been one of extraordinary simplicity—of preparing men not only to make fortunes for themselves, but to develop the resources of the country into which they go. . . . I asked Mrs. Fritz's brother how long Mr. Fritz has been called the old man, and he said, "I don't know. He was about twenty-five years old when he came courting around our house, and he was the old man then." . . . I make my obeisance to the gentleman whom I honor above all others in the engineering profession. I stand always uncovered in his presence. I wish him a long and a happy life, and that the rest of his life may fulfill all the conditions that Mr. Abram S. Hewitt stipulated in his letter, and being yet a young man that is a great big wish.

The New Shops of the Atchison, Topeka & Santa Fe.

[WITH AN INSET.]

The location of the principal shops of the Atchison, Topeka & Santa Fe has been at Topeka, Kan., since the early days of the road, the first repair work being done in a machinery annex to the roundhouse, at that time located on Sixth street. The present site of these shops was at that time occupied by the old King Bridge Works, the buildings being adjacent to the Atchison line of the road, which, as the name indicates, was the first part to be built. These shops having been vacated by the bridge works, they were acquired by the railroad company and the locomotive department moved into them in January, 1878. There were accommodations for a machine and erecting shop and blacksmith shop, and a building for the boiler shop was added. Some two years later the car department was added and suitable buildings erected. Referring to the accompanying general layout of the shops, these old locomotive department buildings are located on the tract west of the main line to Atchison and are not shown in the drawing; they are the shops which are to be superseded by the new plant described below. All of the buildings east of the freight car repair shed are new, and the tract on which they are situated was bought in order to enable this extension to be made. The main line from Kansas City passes just south of the shops, and the Kaw River lies to the north, affording a convenient source of water supply.

As these are the principal shops of the Santa Fe system, in addition to handling the repairs in the territory in which they are located, all fire-box and heavy machine work from as far east as Chicago, as far west as Albuquerque, N. Mex., and as far south as Purcell, Ind. T., will be sent here. And since repair material for the Pacific Coast, coming from the East, must pass this way, such work as flanging fire-box sheets and other work that may be handled more easily here than in the smaller shops in the west will be attended to en route. Also stock material for all of the other shops is gotten out here, nearly 10,000 stock orders having been handled in 1901. The repair records for 1901 show 345 locomotives, 450 passenger cars and over 20,000 freight cars. It is expected that the new shops will be in readiness early in the coming year, and with the improved facilities which they will afford, the building of a large number of new locomotives is contemplated. This in brief is the business to be handled at this point.

In the new shops the latter-day practice of concentrating several of the departments in one large building has been followed, the machine and erecting shop and the boiler and tender shops all being under one roof. Other new buildings are a central power station, a large blacksmith shop, an office building for the Shop Superintendent, three large lavatories and an underground oil storage house. The wheel shop shown in the plan has not yet been begun, its erection being postponed until a future time.

Power Station.—The power house is located centrally with regard to the new buildings. It is 176 ft. long and 57 ft. 4½ in. wide, and is partitioned transversely, dividing it into engine and boiler room. The former is 52 ft. x 70½ ft., and the latter 52 ft. x 101 ft. inside, the height to truss being 26 ft. 1½ in.

The foundations of this building as well as of all others are concrete mixed in the proportion of 1 of cement, 2 of sand and 3 of stone. The walls are brick, 13 in. thick and the roof is Ludowici tile carried on steel trusses. The partition wall referred to above is brick, 18 in. thick to the height of the side walls of the building, and 13 in. above this. The roof has a monitor above

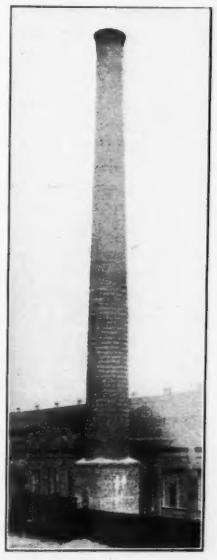
the boiler room, and over the engine room are placed Star ventilators. The floor is cement and the inside finish is white porcelain bath tile to a height of 6 ft., the walls above this being coated with a white enamel paint.

The chimney, situated on the west side of the building, is 90 in. in diameter and 160 ft. high. The foundation is concrete, the square base of building brick and the circular part of Custodis brick.

South of the building and adjoining it is a large concrete-lined pit, 18 x 46 ft., and 14 ft. deep, forming a part of the coal and ash handling scheme. This latter is convenient in its arrangement and should prove economical in operation. Two tracks serve the pit, one being over it and the other beside it. In the pit, beneath the first of these tracks, is a large hopper into which dump cars may discharge their loads. The track beside the pit is for cars from which the coal must be shoveled. The discharge from the hopper is through a Link-Belt Machinery Co.'s crusher having a capacity of 25 tons per hour. The crusher discharges into a Link-Belt conveyor running directly below and which passes beneath the boilers to the north end of the boiler room, ascends overhead and empties into storage hoppers above the boilers, having a capacity of 300 tons.

This same conveyor also handles the ashes, provision being made for discharging the ashes directly into it from beneath the grates. The ashes are discharged by the conveyor into hoppers placed over the coal track and may be emptied directly into a car standing on the latter.

The boiler plant comprises six locomotive-type boilers, with space for two additional. Five of these furnish steam at 150 lbs., while the sixth is designed for 250 lbs. to furnish a supply for test purposes, a pipe line connection being made to the erecting shop. All of these boilers have wide fire-boxes with a grate area of 47½ sq. ft. They have 150 3-in. flues, 18 ft. long, and are $73^{15}/_{16}$ in. in diameter at the front ring, except the high pressure unit, which is 73¼ in. The fuel from the overhead hoppers is fed to Green chain grates, the arrangement for which, as also that for discharging the ashes to the Link-Belt conveyor, is plainly shown in the transverse section of the boiler room. The grates have a guaranteed efficiency of 25 lbs. of coal per sq. ft. of grate area per hour.



At the front end each boiler rests on a cast-iron saddle, having another casting rectangular in plan beneath, with sets of rollers between to provide for expansion. The draft is downward from the smoke-box through the saddle and supporting casting to a brick duct beneath, leading to the chimney. In order to give a smoke-tight and flexible joint between the two castings a sand pocket is formed around the joint in the manner shown in the accompanying detail.

It will be noted that the concrete foundations for the boiler settings form the walls of a pit 10 ft. deep in which are placed the feed water heater and pumps. This pit and the one under the front of the boiler, in which the conveyor runs, connect with the coal pit described above by an incline in the latter of 4 ft. grade. There are two feed pumps of the Fairbanks-Morse fire pump pattern, 10 x 6 x 12 in. duplex, having a delivery pressure of 150 lbs. and capable of handling hot water. The high pressure boiler also has an injector for feed purposes. The feed water heater is a Colles open type having a capacity of 30,000 lbs. per hour at a temperature of 200 deg. F.

Also located in the pit, midway of the length of the boiler room, is the hydraulic plant for the riveting tower, comprising an accumulator and pump. The pump is a duplex, having a capacity of 80 gals. per minute. The accumulator furnishes a pressure to the riveter of 1,500 lbs. per sq. in.

Just west of the coal pit is a brick-lined blow-off well 22 ft. deep and 4 ft. inside diameter. All drainage from the station except that from the floors is conducted to this well, which latter discharges to the sewer. As the sewer is only 3 ft. 9 in. below the surface of the ground, some means had to be provided for raising the water to this level. This was accomplished by placing an ejector in the bottom of the well to be operated by the boiler blow-off.

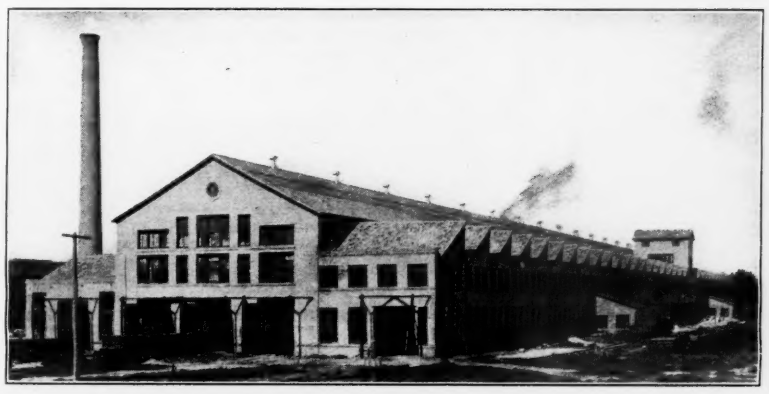
In order to obtain suitable feed water for the boilers it was necessary to put in a treating plant, the system adopted being that of the Tweeddale Softening and Water Purifying Co. of Denver, Colo. The plant has two tanks 16 ft. in diameter and 16 ft. high with a capacity of 25,000 gals., which may be used independently or together.

The live steam header is supported from the roof trusses in the boiler room and on passing to the engine room is carried on wall brackets. The boilers are divided into two sets of three each, which sets may be used independently when occasion requires. The steam header branches before entering the engine room, one branch passing into the room along the west wall to supply the engines on that side; the other runs along the partition wall to the east wall of the building, entering the engine room along the latter. Connections to the engines are made through long-sweep bends and separators.

There are four generating units in the engine room with space for one more. Three of these are 200-k.w., 250-volt generators direct connected to Ball tandem-compound non-condensing engines, 25 and 16 x 18 in., running at 200 r.p.m. The fourth is a 75-k.w., 250-volt unit, direct-connected to a 10 and 16 x 14 in. Ball engine of the same description, running at 270 r.p.m. The generators, as well as all other electrical equipment, were furnished by the General Electric Co.

Economy and ingenuity were exercised in providing a compressed air unit. A 20 x 48-in. Corliss engine, already on hand, was fitted with an Ingersoll-Sergeant 18¼ x 48-in. air cylinder, placed tandem. The engine runs at about 65 r.p.m. and will furnish air at 100 lbs.

The exhaust header is placed in a concrete trench running longitudinally in the middle of the engine room floor. At the partition wall at the south end of the room the header branches, one branch running to the locomotive shop heating system, and the other through the feed water heater and thence through a back-pressure valve to a free exhaust through the roof. A 7½-ton Whiting hand-power crane serves the engine room.



Exterior Machine and Boiler Shop.

Interior Machine and Boiler Shop.

Power Distribution.—The leads from the generators to the switchboard are carried in the exhaust header conduit, passing up from the latter through the floor to the back of the switchboard through tile pipe 4 in. in diameter.

The 11-panel switchboard is made of blue Vermont marble 2 in. thick and is 23 ft. long by 7½ ft. high. Two of the panels are used for gages and the remaining nine control the machines and distribute the current for light and power. The cables from the switchboard lead out through 2½ and 3-in. pipe, all except those supplying power and light to the locomotive and blacksmith shops, running to a distributing tower on the top of the station.

The Locomotive Shop.—This is a splendid building and remarkable in at least two particulars. One of these is the roof construction of the side bays and the other is the dimensions, 850 ft. long and 155 ft. 10 in. wide, making it the longest and possibly the largest shop of this kind in the country. It is divided into three bays, the central of which is 74 ft. 3 in. wide. The north half of the building is the boiler and tender shop and the south half the machine and erecting shop. This latter has longitudinal tracks, three in number, placed in the central bay and spaced 23 ft. centers.

The foundations of the building, as has already been mentioned in connection with the power station, are concrete running down to the first clay stratum. The steel frame work has four rows of columns, each column resting on a heavy concrete pier and spaced 25 ft. centers. The piers for the columns supporting the main truss also carry the columns for the crane girders. The main trusses are braced longitudinally in pairs and the wall columns have portal bracing between pairs, at intervals. The assumed load for the roof trusses is 50 lbs. per sq. in., on the basis of 10 lbs. for snow, 25 lbs. for wind, and 15 lbs. for the covering. The members were calculated on a basis of 16,000 lbs. per sq. in. for tension and 14,000 lbs. per sq. in. for compression.

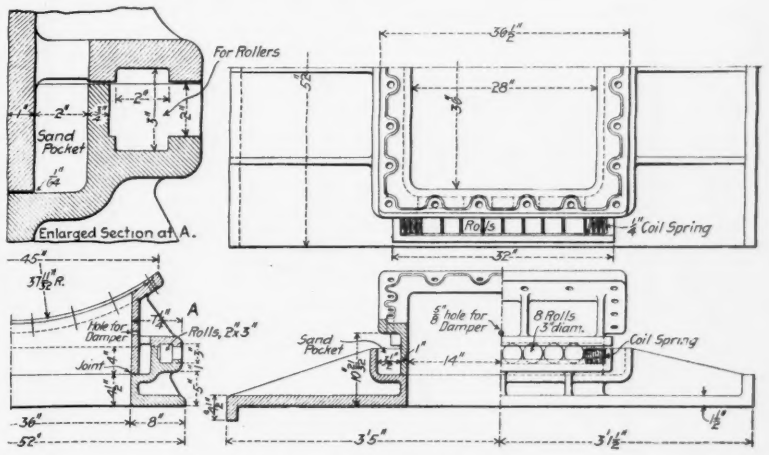
The walls are brick, 13 in. thick, and the roof is Ludowici tile. The tiles are laid on 2 x 2-in. timber strips to which every fourth tile is fastened by copper wire. Skylights formed of translucent fabric, having a width equal to one panel of the top chord of the truss, and running the length of the building are placed one in each side. Star ventilators are placed every 25 ft. in the ridge of the roof.

The saw tooth roof over the side bays is, we believe, the first use made of this form for railroad shops in this country. The "teeth" have a northern exposure for light and as the sides of the central bay above and between these teeth are also glazed, the shop is flooded with light.

In the east bay, 300 ft. from the north end, is the riveting tower, 25 ft. x 38 ft. 9 in., and 62 ft. to the bottom chord of the roof truss. In this same bay, extending from the riveting tower to the south end of the building, is a balcony, to support which an additional row of columns is placed centrally in the bay.

In the central bay and having a travel of the full length of the shop are two 60-ton cranes of 70 ft. 6 in. span, furnished by the Whiting Foundry Equipment Co. Two 5-ton cranes, 35 ft. 9½ in. span, serve the tools in the west bay and in the riveting tower are two hydraulic cranes of 24 ft. 1 in. span, from Bement, Miles & Co., one being of 10 tons and the other 25 tons capacity.

The floor foundation is formed of 6 in. of concrete resting on the natural soil well tamped. On the concrete are laid 3 x 4-in. yellow pine sleepers, 18 in. centers, the whole being covered with 2-in. No. 1 hard maple, surfaced on one side and two edges and milled for ¼ x 1-in. pine splines.



Detail of Boiler Saddle.

Three tracks run through the central part of the shop its entire length. Beneath these tracks at the north end are the pits, the middle one of which is 450 ft. long and the side pits 160 ft. long. These pits are concrete, walls and bottom, with a timber coping for carrying the rails. In handling locomotives on the erecting floor, they will be brought in on the middle track and stripped. The cranes will lift them off of their wheels and set them on special trucks or blocks on the side tracks, back of the pits. The wheels will be sent to the lathes if necessary and afterward set over one of the side pits, where the final operations, such as wheeling, valve setting, etc., will be done.

All of the machine tools are to be in the side bays;

the heavy ones will be in the west bay under the 5-ton cranes. While many of the tools in the old shop will be used, a large number of new tools have been bought, and although we cannot give a complete list of these the larger and more important are worth enumerating. These will include a motor-driven Niles hydrostatic driving wheel press, 300 tons capacity, 96 in. between tie bars; Niles double axle lathe; Mitt & Merrill No. 4 key seater; Niles 96-in. vertical boring and turning mill; Pond 84 x 84 in. x 16 ft. planer for locomotive cylinders; Niles 51-in. vertical boring and turning mill; double-head locomotive frame slotter, 42-ft. bed; Bement, Miles & Co. 10-ft. horizontal rod miller; Niles 6-ft. radial drill; Bement, Miles & Co. 42-in. car wheel lathe; also a cold saw, water tool grinders, etc. All of these tools are individual motor driven.

Under the balcony in the east side are grouped the lighter tools, there being five groups, four of which have a 20-h.p. motor drive and the fifth 25 h.p. The tool delivery room and office of the Machine Foreman are on this side, while that of the General Foreman is on the west side, midway.

In the balcony will be located the brass working department, stud and screw machinery on stock work, air-brake repair department and the manufacturing department of the tool room. This latter is located directly over the tool delivery room with hand elevators between. The remainder of the balcony will be given over to the tin shop. Two elevators, driven by 7½-h.p. motors, operate between the balcony and ground floor. The erecting floor of the shop will be provided with portable benches.

Boiler and Tender Shop.—The tool arrangement in the boiler shop will follow the machine shop in the plan for having all heavy tools in the west bay. The boiler shop is divided transversely into two parts by the material track coming from the storehouse, north of which the larger tools will be placed. A large number of heavy new motor-driven tools will be added to the equipment, among which are a Long & Allstatter plate-splitting shears for 1-in. plate; Bement, Miles & Co. 450 ton hydraulic flanging press, 7 ft. x 12 ft. between plate centers; Long & Allstatter flange punch, capacity $1^3/_{16}$-in. hole in 1⅛-in. plate; Cleveland punch and shear 15 ft. 9 in. countersinking radial drill. An oil-burning flanging and annealing furnace has been put in to serve the large flange press. At the outer end of the furnace, outside of the building, a large face plate for annealing will be placed. The outer opening of the furnace house is provided with a Kinnear steel rolling door.

For light sheet or tank work the tools will be placed south of the material track. These will include a Long & Allstatter motor-driven multiple punch and hand spacer for tank plates, capable of punching six ½-in. holes in ¼-in. sheets; motor-driven Sturtevant steel pressure blower; Cleveland punch and shear angle iron bending rolls, capacity 3 x 3 x ½ in. angles; Long & Allstatter motor-driven double angle-iron shear, capacity 5 x 5 x ½ in. angles.

The east bay of the boiler shop will be used for tank and tender construction and repairs, and for the flue department. This latter will have a motor-driven flue rattler operating in water, with special loading and unloading features. The riveting tower is also in this bay. There are two hydraulic riveters, one of which has a 17-ft. gap and is capable of exerting 150 tons pressure on the rivet, and arranged for six intermediate pressures. The other riveter has a 12-ft. gap, 100 tons maximum pressure and three intermediate pressures.

For the entire shop there will be 530 h.p. of motors ranging from 2 to 25 h.p. This does not include the crane or elevator motors.

Blacksmith Shop.—The form and appearance of this building are shown in the accompanying engraving from a photograph. It is 100 x 400 ft., with concrete foundations, steel frame and roof trusses and brick side walls. The end walls are brick to the window tops, above which they are corrugated galvanized iron. The roof trusses span the full width of 100 ft. and also support the shafting. The side portions of the roof are tile and the upper, flatter part of gravel. A monitor runs the length of the building in the center of the roof. The equipment includes three steam generating scrap and axle furnaces designed for burning oil or coal; two other similar furnaces with the exception of the boiler; two double spring furnaces, and six miscellaneous furnaces, all oil-burning. There are two 5,000-lb. double-frame Chambersburg steam hammers, and 13 smaller hammers ranging from 4,000 to 250 lbs., mostly old equipment. There will be 40 smith fires, 20 of which are new, and a new outfit of spring machinery comprising taper rolls, nibber and trimmer, punch and shears, squeezer and a 100-ton spring banding press; also a spring testing machine, which is not new. There will also be the usual equipment of bulldozers, punch and shears, bolt headers, etc. There are four motors in this shop of 50, 25, 20 and 27 h.p., respectively, the latter being a Sturtevant No. 20, which run the blowers and shafting.

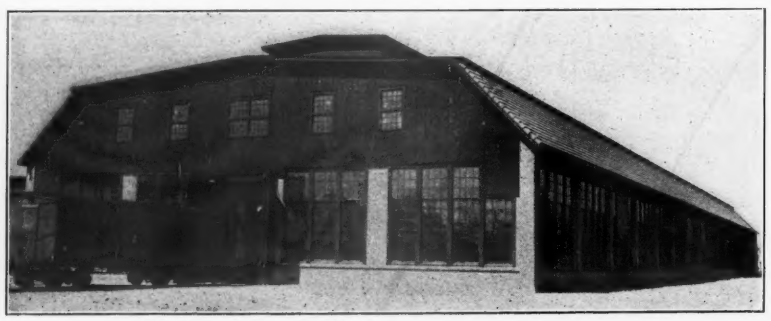
Wheel Shop.—This shop, which, as was previously explained, is not yet begun, is to be a machine shop for the car department. It is to be 50 x 150 ft. and will be similar to the other buildings in construction. The equipment will be mostly tools already on hand which will be grouped and motor driven. There will be two individual motor-driven wheel presses and also a punch and shears for steel car work, thus making the car department independent of the locomotive department.

Oil Storage.—Fuel oil is stored in a 20,000-gallon tank placed in a pit having brick walls, and roofed over; arrangement is provided for feeding the oil from the tank cars direct to this tank. In the pit are two smaller tanks to which oil may be admitted from the storage tank, and which are used turn about. An air pressure of 20 lbs. is introduced into these tanks through a reducing valve, to force the oil through the distributing pipes. These latter are laid on a grade so that they will drain back to the tanks. All valves may be operated from above ground.

Lavatories.—Excellent and thoughtful provision has been made in this regard. There are three lavatory buildings, all on the west side of the main building. They are 26 x 76 ft., of concrete and brick, with tile roof on wooden trusses, and cement floor. They are equipped with wash troughs and individual lockers, there being 324 of the latter in each building. They are 14 x 12 in. by 4 ft. 6 in. high, placed in two tiers, and are made of ceiling with expanded metal doors for ventilation. There are 160 lineal feet of cast-iron, porcelain-lined wash troughs piped for hot and cold water. The door arrangement of these buildings, it will be noted, is such that entrance may be had at each side by the wash troughs and the exit made through a double door at the locker end of the room.

Partitioned off from the part just described is a closet having 27 individual sanitary self-flushing hoppers and nine slate wall urinals with floor drain. The buildings are steam heated.

Office Building.—This building is for the Shop Superintendent. It is 30 x 50 ft., one story high and built of brick. It is surrounded by a porch 7 ft. wide, over which the roof of the building is extended. It will have a fire-proof vault, steam heat and toilet conveniences.



Blacksmith Shop—A. T. & S. F.

Heating.—The Sturtevant hot-blast system of heating is used. The locomotive shop has four fan houses built on as wings, two on each side, the locations being shown on the general layout. They may also be seen in the photographic view of this building, which likewise shows the riveting tower. The fan houses are 25 ft. square and each house is equipped with a heating coil, fan and engine. The coils are supplied by the 12-in. exhaust main from the power station, which latter has a connection for supplementing the supply with live steam when necessary. Leading out from each fan house and running to the middle bay is a 5 x 5-ft. underground concrete duct which branches just inside the line of main columns, running north and south. At each column a branch is led off from the main duct to the foot of the column, coming up at one side to the floor level. A riser of galvanized iron, 20 x 24 in., discharges the air horizontally 8 ft. above the floor. The system is guaranteed to maintain a temperature of 60 deg. F. in zero weather.

Lighting.—All of the shop buildings, offices, the freight and passenger stations and the yards are to be lighted by electricity. For general illumination of the shops and for lighting the yards the enclosed type, 230-volt incandescent-arc lamp will be used. They are copper finished, and made weather proof. The tools will be provided with one or more 16-c.p. 230-volt incandescent lamps, and there will be 26 wall receptacles for portable lamps. There will be some 1,500 incandescent and 150 arcs used altogether, of which 224 incandescent and 60 arcs will be in the locomotive shop. All of the electrical distribution, except the lines to the locomotive and blacksmith shops, which are through conduits, is by means of pole lines.

The yards are piped for air and water, the company having its individual pumping plant on the Kaw River. The estimated cost of these improvements is approximately $750,000, not including the wheel shop. Of this amount $400,000 is for equipment and $350,000 for buildings.

Acknowledgments for the data which enabled us to present this description are due Mr. George R. Henderson, Superintendent of Motive Power; Mr. W. B. Storey, Jr., Chief Engineer, and Mr. F. H. Adams, Engineer of Shop Extension.

Good Practice in the Use of Distant Signals.*

Although several papers have been read before the club on the distant signal, the constant discussion of the subject makes it evident that it is still an interesting one. Either the practice on the several roads is very different, or else there is difficulty in maintaining and operating these signals. An editorial in the *Railroad Gazette* of July 16, 1902, commenting on the discussion that took place at the last meeting of the Signal Club brings out the fact that the members held very different views of what can be considered good practice in the use of the distant signal, and suggests that a committee be appointed to inquire into the practice of the different roads.

In answer to inquiries addressed to several roads the following replies were received:

	Distance of (Mechanical) Distant from Home Signal, in feet	
	Standard.	Maximum.
Delaware, Lackawanna & West...	1,200 to 3,000	...
Erie	1,200 to 1,800	...
Michigan Central	usually 1,200	...
Chicago, Milwaukee & St. Paul...	1,200	3,100
Lake Shore & Mich. Southern....	1,200	2,200
Do. in future	1,500	...
Chicago Great Western.....	1,200	2,000
Chicago & Alton	1,200	3,200
Illinois Central	1,500	3,000
Chicago, Burlington & Quincy....	1,500	3,000
Baltimore & Ohio	1,500	2,050
Chicago & North Western.....	1,500	...
Chicago & Western Indiana.....	1,500	2,560
Lehigh Valley	1,800	3,000
New York, New Haven & Hartford	1,800	3,125
Penn. Lines west of Pittsburgh...	2,000	2,600
New York Central & H. R.....	2,000	...
Cleveland, Cin., Chic. & St. Louis..	2,500	4,000
Pennsylvania	2,500 to 3,000	4,500
Pittsburgh & Lake Erie.....	Has no mechanical distant signals.	
Do. (one power plant)....	...	1,600

These replies show that the roads have been and are putting the distant signals further away as the speed of trains has increased; for 1,200 ft. was the distance that the distant was put from the home signal on most roads so short a time as 12 years ago. Undoubtedly at places where the distant signal is but 1,200 to 1,500 ft. away from the home signal, it is expected that the engineer will be able to see the signal before he reaches it, and that in bad weather the train will be brought [partially] under control before reaching the distant signal.

In defining the distant signal as "A fixed signal used in connection with a home signal to regulate the approach thereto," the American Railway Association recognizes that this signal will be the governing signal in determining the speed at which a train will approach the home signal. If this signal is to be so used, it must, to properly answer the purpose, be so placed that engineman after passing it, will have space enough in which to control the speed of the train. If the speed of trains is to be so high that they cannot be stopped in the distance between the distant and the home signal, then the distant signal must be put farther away. No arrangement of mechanical connections is now in use whereby the signal can be properly operated far enough away to allow our fastest trains to be brought to a stop. Safe working and economy both require that the signal be put as near to the home signal as is possible and in striving for the proper medium between a distance that is impracticable and one where there is no distance at all, a distance of 1,200 to 1,500 ft. would seem to be better practice than a greater distance. . . . Our distant signals have occasionally given a clear indication when the home signal was in the stop position and while no serious accident may have happened from such a failure, it cannot be said that it will not be the cause of one at any time.

It is comparatively easy for a wire-connected signal to get out of order and give a wrong indication. The wires get out of adjustment and the signal droops unless the lever is worked with considerable force. If the wires are adjusted tightly to keep the arm from drooping, a broken back-pull wire will result in the arm being pulled to give the clear indication. If a coating of ice collects on the pulleys, as usually happens several times during a winter, a signal left in the clear position for a very short time will be held in that position when the lever is put normal. If the wires get twisted or catch in a pulley nearer to the pole than to the lever, the lever can be put normal with but little additional force, so little indeed, that it is seldom noticed by the signalman. With ice and snow on the pulleys there is often sufficient resistance, in cases where the down pull wire has been adjusted the tightest, to hold the signal in the clear position when the lever is put normal.

Although the work may be put in and maintained in the best manner possible and every endeavor be made to get the signalmen to properly perform their duties, the fact remains that our apparatus fails and the signal sometimes gives a wrong indication.

Mr. Rosenberg, of the Lehigh Valley, writes: "The longest wire that we use, or have in use, is 3,000 ft., but I do not hesitate to say that it is a failure, as there are times when the lever can be pulled in either direction and the signal will not move more than 10 deg. I doubt if a distant signal will work properly over 2,000 ft. away, especially if there are any curves to meet.

Mr. Mock, of the Michigan Central, says: "We should get our distant signals out farther than 1,200 ft. from the home, but I am unwilling to specify mechanically connected signals a greater distance than 1,200 ft. from

*A paper to be read before the Railway Signaling Club at Pittsburgh, Nov. 11, by W. H. Elliott, Signal Engineer of the Chicago, Milwaukee & St. Paul.

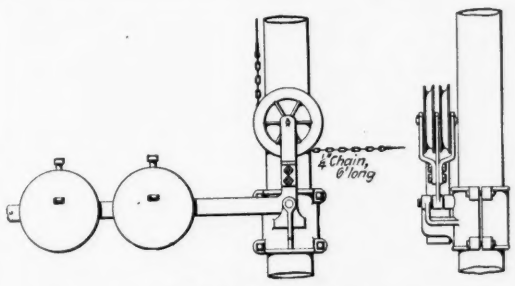
the lever, without compensators (and I have not much faith in the reliability of compensators). Present traffic conditions require a location of the distant signal farther out, and the only solution is the use of power signals equipped with repeaters and locking the derails (closed) while the signal is in the clear position."

Mr. Dunham, of the Illinois Central, says: "The greatest distance we are operating a mechanical signal is 3,000 ft. The signal, however, has not been entirely satisfactory for the reason that we have so much trouble in keeping the wires properly adjusted."

Mr. Grafton, of the Pennsylvania Lines West of Pittsburgh, writes: "In the last two or three years owing to the high speed of trains and certain conditions we have been placing distant signals 2,000 ft. from the home signal. This I consider the maximum distance that you can work a distant signal satisfactorily; mechanically connected. We are now figuring on putting up electric semaphore signals for distant signals."

Mr. Christofferson, of the Chicago Great Western, evidently has little trouble with long wire lines for he says: "The longest wire line we have is about 2,000 ft.; but I have worked wire connected signals successfully 4,800 ft. from the tower. We use wire compensators in all our wire lines over 700 ft."

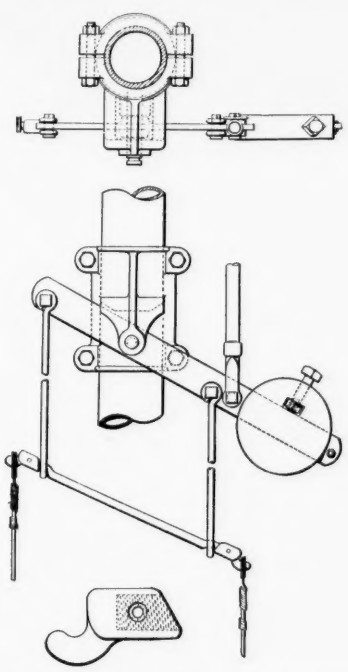
Mr. Fowle, of the Pennsylvania R. R., says: "At one or two of our interlockings the distant signal is



C. M. & St. P. Compensator.

4,500 ft. from the cabin, but we do not approve of this and are considering the advisability of installing electric current distant signals when the distance is over 2,500 ft. between the home and distant signals. We have now several electrically operated distant signals which are giving very good results."

With long wires thus giving trouble is it not better to put the distant signal as close to the home signal as the operating department can get along with, than to try and operate the signal at the maximum distance that the signal can be worked and thus increase the chance of failure? With derails placed 500 ft. from a fouling point and the distant signal 1,500 ft. from the home the



C. M. & St. P. Disengaging Lever.

The detail at the bottom is the brass hook forming the end of the lever.

connecting wires will average 2,075 ft. in length. Where switches are placed 1,400 to 1,900 ft. from the tower, as they are at many plants, the distant signal will be 2,975 to 3,475 ft. from the lever, and at these distances it must be admitted it is a very difficult matter to operate the signal properly.

The apparatus ordinarily provided by the signal companies is as simple as possible, consisting of the lever in the machine, the two lines of wire to the signal, the balance lever on the signal and the connections from the balance lever to the signal arm. The balance lever is provided with a weight usually of about 10 lbs., which is expected to overcome the weight of the arm and require force to be exerted in the clearing of the signal. With this light weight, a slight pull on the down pull wire will lift the weight, if the back pull wire is disconnected; and in order to guard against this the wire must be kept loosely adjusted. With the wires loosely adjusted the signal will not come down to the clear position when the lever is pulled unless the lever is moved with a jerk or quick motion at the end of the movement; therefore the proper clearing of the signal depends on the signalman. How well and regularly he does this all of us probably know; and no doubt all have wished that we could make the signalman change places with the engineer who has to be governed by the indication given.

Changes in temperature change the length of the wires and a signal that may work well at one temperature may not work at another. A wire 2,000 ft. long expands or contracts 1.8 in. for each change of 10 deg. in temperature, and as the stroke of the wire at the lever is ordinarily 14 in., a change of 10 deg. makes an appreciable difference in the movement of the signal and the lever must be pulled with sufficient force to overcome this.

Under certain conditions that occur during freezing weather the wires cannot be kept free to move in the pulleys, and the signalman has to be depended on to know that the signal is working properly, and to fasten it in the normal position if it does not. Boxing does not prevent ice from forming and clogging the wires, as the boxes cannot be made tight enough to keep water out. Oil pipes are not entirely satisfactory, as there is sufficient friction in the pipe, the stuffing box, and, in cold weather, in the oil, to hold the wires and keep the signal from going to the normal position in case the back wire should break.

To overcome the probable giving of a wrong indication when a wire breaks, we are using on the C., M. & St. P. a disengaging lever which up to the present time has successfully released the signal each time the connection has broken. This lever must be made of a certain exact dimension or else it will catch and not release as it should do. It is the outcome of many trials and almost as many failures.

To overcome the effect of change in temperature on the length of the wires and, also, to do away to a large extent with the personal element in the working of the lever, we are using a compensator which is nothing more than a crank having a chain sheave on a short arm and two 100 lb. weights on the long arm, and the whole fastened by a bearing near the bottom of the signal pole. The arms are in the proportion of 4 to 1, and with the weights put at the end of the long arm, a strain of about 700 lbs. is put on the two wires. With this device no adjusting screws are used, as any difference in the length of the two wires results in an increased strain being put on the shorter wire and the stroke of the signal is shortened. Great care must be taken to properly adjust the wires when they are connected up, and then after that no further adjusting is necessary. Both wires must be given the same stroke at the lever, as any increased travel of the back pull wire allows the weight to drop when the signal is cleared and the weight must be raised again, when the lever is put normal.

If the weight compensator is used, the disengaging lever must be used also, as without this the breaking of a wire will put a strain of 700 lbs. on the other wire and the signal would be pulled to clear unless it were the down-pull wire that had broken. The disengaging lever must be made to disengage both ways, as it will not do to have a 700 lb. pull out on the lever when a man is working it.

In putting in the connections to a signal, it is very necessary to run the wires so that the least number of turns will be used. Each turn adds considerably to the work to be done, and unless the turns are near to the lever, the increased load causes the wire to stretch and the stroke at the signal is so much reduced that it is hard to make the signal go to the proper position. With three turns in the connections and a wire 1,700 ft. long, there will be sufficient stroke at the signal to work it without much difficulty. A large number are in use with four or five turns that work very well, but with more turns than this considerable difficulty is experienced.

When distant signals are pipe connected, the signal may be depended upon to give a correct indication under most conditions. There is much less spring in pipe than there is in wire, and the signal will move with the lever irrespective of the manner in which the lever is pulled. With two compensators in a line 2,000 ft. long, the pull required, while a heavy one, is not more than many levers are loaded with. Although the pull required is a heavy one, it is possible to spring the pipe and put the lever normal with the signal held in the clear position. It will require so much additional force that the signalman will know that something is wrong; but as ice and snow packing around the carriers will make it necessary to exert about the same additional force, the signalman cannot be sure from the pulling of the lever whether the signal has been returned to the normal position or not.

Repeaters working in connection with the distant signal to show if the signal has moved to correspond with the position of the lever, are an additional safeguard, and if kept up and observed will give notice to the signalman that the signal is not working properly, and that he must take the necessary steps to make the indication given a safe one.

No doubt repeaters would be more generally used than at present were it not for the expense of installation and maintenance, and the fact that the signalman has to be depended on to watch the repeater and see that the proper indication has been received each time the lever is worked. Where the repeater has worked without failure for months and possibly a year or two the men get out of the habit of looking at it and there is a possibility they would not observe it when a failure of the signal did occur. In the last two years two cases have come under my observation when the distant signal has caught at clear and trains were derailed in consequence, although the signalman could see by the back light that the signal had not returned to the normal position, and the engineers could see that the home signal was against them, the track being straight and the nights clear.

If our appliances are going to fail so easily and if the men working in the towers are not going to detect failures and take the necessary precautions, is it not better to put in as few of these signals as it is practicable to get along with? Will it not be better to use signals operated by power, where the personal element is reduced as much as possible, and where the reliability of the apparatus has been amply proved? Is it not the best possible arrangement to make use of a power-operated distant signal and put the signal far enough from the home signal to allow a train to pass the distant signal at speed and have track room enough in which to stop before reaching the home signal? Will it not be the safest arrangement to do away with the distant signal wherever the speed of trains is reduced to 20 miles an hour and the approach to the home signal is reasonably good?

The cost of the different arrangements now in use is as follows:

The disengaging lever with the two links in which it hangs, and the pins by which the links are fastened to the balance lever, will cost $1.50.

The weight compensator, consisting of the wrought iron crank, cast-iron bearing and the two 100 lb. weights, costs $9.00.

A wire connected distant signal 2,000 ft. from the lever will cost for labor and material $140.

The same, if pipe connected, $440.

Repeaters with two lines of No. 12 B. W. G. bare copper wire run to distant signal 2,000 ft. from tower, wires being run on telegraph poles, will cost $110.

Battery maintenance for four repeaters for one year will cost $36.

Power-operated distant signals, provided with two lines of No. 12 B. W. G. bare copper wire run on telegraph poles for 2,000 ft. from tower, all batteries, etc., with installation complete, will cost $310.

Battery maintenance for one year for four power-operated signals, each signal being cleared 40 times a day, will cost $40.

Railway Signaling Club.*

Report on Compensation and Crank Motion.

The committee to report on crank and compensator motion reports that the table on expansion and contraction of pipe, presented at the meeting by Mr. C. A. Christofferson is correct. The committee recommends that the full stroke in a pipe line should come direct from the lever, and, in case it should be necessary to gain stroke on account of the lost motion due to wear in the connections, the stroke should be gained at the lever. There will be less spring put in the connections by gaining stroke in this manner and the greater the difference between the amount of spring and the travel of the pipe, the more certain will be the operation of the movement.

A compensator with 14 in. crank arms will take care of the expansion and contraction of a pipe 700 ft. long and of 1,400 ft. of pipe line if the arms are made 17 in. long.

C. A. Christofferson, W. H. Elliot, E. D. Wileman, Committee.

Report on "When Can an Interlocking Plant be Economically Operated by Power."

The committee to report on this subject reported in substance as follows:

This question cannot be determined by any set rule. In general a power plant can be economically used, 1st. When there is a large amount of traffic or when it is important to save fractions of minutes. 2nd. When the space required for lead-outs and pipe lines could not be given up for such purposes.

3rd. When a plant to be operated is so divided (say by a draw or the extreme points so distant, that it would require several mechanical machines to do the work.

4th. When a plant is large and the traffic so frequent that a number of levermen would be required.

5th. In a small plant if it is located close to where a power plant is already established.

"At what number of levers (mechanical) would it be economy to substitute power?" You cannot say that a place which would require an 80 lever mechanical machine should be installed with power instead, as it might be at a crossing of a number of roads with comparatively few trains and quite an interval between conflicting movements; then one man would in all probability have sufficient time to handle the traffic at such a place and there would be nothing to be gained. On the other hand a four lever mechanical machine requiring

*Committee reports to be presented at the Pittsburgh meeting, Nov. 11 and 12.

two men on each trick could have been operated by power advantageously.

"How does the cost of maintaining a power plant compare with a mechanical plant?" Practically the same (both in material and labor) but slightly in favor of power plants, the larger the plant the more in favor of power.

"How much quicker, if any, can movements be made with a power plant, than with a mechanical plant?" Power plants are 300 to 500 per cent. faster and with a further advantage that a leverman can perform the work with practically no effort, where with the mechanical, the work would naturally lag, it being more arduous.

"Are the chances any greater for giving false indications with a power plant, than with a mechanical plant?" There is, of course, a chance with either, but when properly erected and maintained, one should not be more liable than the other.

E. H. Spalding, W. L. Dryden, Geo. M. Goff, W. H. Lane, Committee.

The Wabash Station at Pittsburgh.

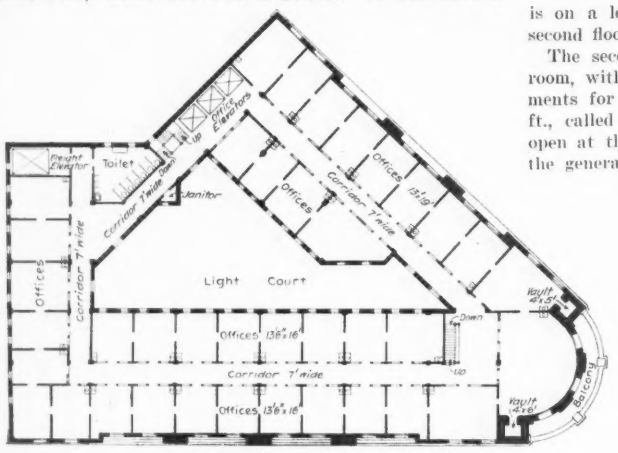
A million dollars is given by President Joseph Ramsey, Jr., of the Wabash, as the cost of the new passenger station which his road is to build in Pittsburgh. The architect has just completed the plans for this station, which are given herewith, and bids are now being received for the erection of the buildings. Pittsburgh already has two handsome passenger stations, both finished within the past 18 months, the union station of the Pennsylvania, and the Pittsburgh & Lake Erie station. The new Wabash station is to be a fit mate for these.

The station's location is peculiarly fortunate. Within one block run all but three of the important street car lines in the city, and these three are less than four blocks away. Even the cars from the suburban towns pass close to the station, making it remarkably easy of access. It is only two blocks from the business center of the city.

Excavations for the station will be begun Nov. 15, when the road secures possession of the buildings which now occupy the site. The station is to be completed by June, next.

The following description is furnished by Theodore C. Link, of St. Louis, the station architect of the railroad, who prepared the plans:

The Pittsburgh passenger station is to occupy the larger part of the triangle which is bounded by Liberty avenue, Ferry street and Fourth avenue. It will have a frontage in Liberty avenue of 184 ft. 6 in., and a frontage in Ferry street of 221 ft. The train shed, 100 ft. wide, will extend from the passenger station southwardly about 450 ft., crossing Fourth, Third and Second avenues, about 35 ft. above the street level.



Typical Office Floor.

The headhouse has a large concourse on the ground floor, principally intended for the transaction of such business as the departing traveler needs to attend to. In it are the ticket offices, sleeping car ticket office, telegraph office, parcel check room, baggage check room, and a café with serving room. It is entered through a handsome circular vestibule at the point of intersection of Liberty avenue and Ferry street. The carriage entrance is in Fourth avenue, where it will be sheltered by the bridge which spans the avenue at this point.

Two passenger elevators with a capacity for lifting 70 persons a minute ascend to the second floor, which is on a level with the tracks. An easy ascent to the second floor is also provided by an imposing stairway.

The second story consists of a large general waiting room, with retiring rooms, having ample toilet arrangements for both men and women. A space 40 ft. x 100 ft., called the "midway," which is covered on top and open at the sides, is laid out between the south end of the general waiting room and the bumpers at the ends of the tracks in the trainshed, with gates opposite the various platforms.

A mezzanine floor is introduced over the café, half way up between the first and the second floor story, which will be utilized as a women's dining room.

The basement is accessible both from the concourse on the inside and from the sidewalks in Liberty avenue and Ferry street, and in it will be a barber shop, a Turkish bath establishment, various stores and the kitchens for the restaurant.

The upper six floors of the building are designed for offices, a good part of which will be needed by the road itself. An independent group of elevators will be operated for these offices, and a separate entrance and stairway are provided in Liberty avenue for this part of the building.

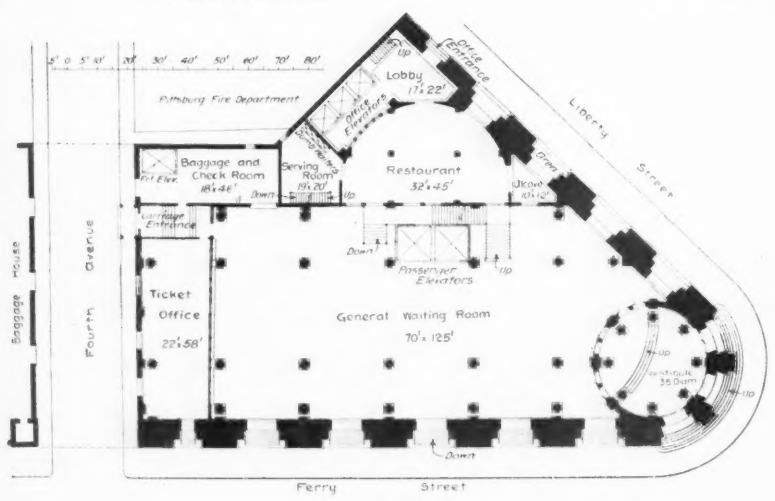
The main baggage room is located on the south side of Fourth avenue directly under the trainshed, and numerous platform elevators will lift the baggage to the track level. This room is connected with the checking office in the headhouse by means of pneumatic tube so that passengers may check without crossing the street.

Proposed Passenger Station of the Wabash Railroad at Pittsburgh, Pennsylvania.

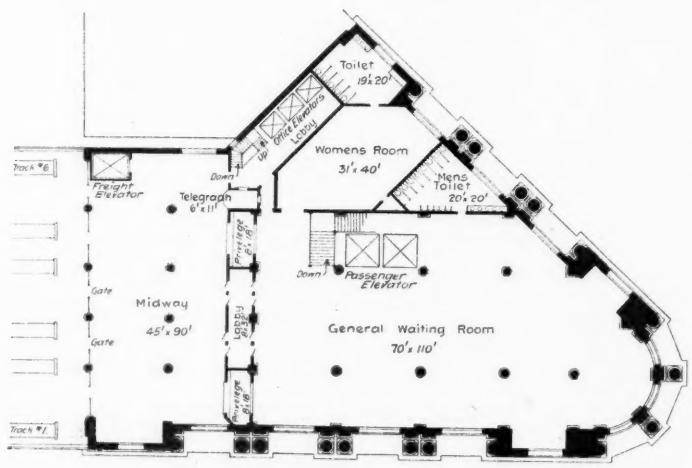
Theodore C. Link, Architect.

A large power plant will be included in the improvements. This will generate electricity for light and for motive power for the large number of elevators which will be required. The entire group of buildings will be heated from the central plant.

The architect has been instructed to equip this new addition to Pittsburgh's notable buildings "better than the best." The specifications call for a first-class fireproof structure with a liberal use of marble, tile and glass mosaic work. The façade is monumental in its proportions and the treatment and will be mostly in stone.



Ground Floor.



Track Floor.

Floor Plans of Passenger Station to be built at Pittsburgh, Pa., for the Wabash Railroad.

The Consolidated Lake Superior Company.

In a recent issue we gave a few facts about the Michigan Lake Superior hydraulic power plant at Sault Ste. Marie, Mich., of the Consolidated Lake Superior Co., which has just been finished. The formal opening was held Oct. 25, just four years after the contract was let. The total length is 13,000 feet, partly through rock. It is 950 feet wide at the intake, and tapers to 200 feet. The fall is 20 feet, and the water will flow with an average depth of 23 feet and a velocity of 4¼ miles an hour, delivering, approximately, 30,000 cubic feet of water every second to the turbines, which will develop 60,000 horse power.

Throughout the intake the sides of the canal are timbered below water with masonry. The sides through rock are vertical. Through sand the slopes are 1 in 1, the bottom being 164 feet and the top 214 feet. In clay the trapezoidal prism is gradually converted into a compound trapezoid, the sides consisting of three different slopes—the top 1 in 1, the center 4 in 1 and the last 10 in 1—this form of canal prism expanding into the forebay, the slopes of the latter again becoming 1 in 1.

The power house is 1,368 feet long on the forebay at the lower end of the canal, 100 feet wide and 125 feet high. It is built of steel, natural stone and concrete. As a foundation 1,200 50-foot piles were driven to bed

rock, and were covered with concrete 3 feet thick. On this foundation were built 82 walls of molded concrete blocks 100 feet long, 20 feet high and 3 feet thick, thus making 81 discharge pits 15 feet wide, 100 feet long and 20 feet high, with arched concrete floors and roofs. Above these pits are an equal number of similar chambers 15 feet wide, 20 feet high and 48 feet long for the 320 turbine wheels, the water flowing through these wheels and passing out through the discharge pits into the St. Mary's River. The inner ends of these upper chambers are closed by curved steel bulkheads through which the shafts of the turbines pass and are connected directly with the dynamos on the main floor of the power house. The middle chamber is left open for the passage of ice, etc.

Each hydraulic unit is composed of four 33-inch New American turbines, arranged in two pairs on one shaft, each pair being housed in one case and discharging into one draft tube. The installation is of the horizontal, tandem type, the shaft and operating rigging penetrating the steel plate bulkhead and coming out on the dynamo floor side. Each hydraulic unit under normal conditions, taking 391 cubic feet per second at an effective head of 16 feet equals 568 m.h.p., their efficiency varying from 81 per cent. to 83 per cent. as ascertained by actual tests prior to their acceptance.

The electrical plant which will be installed in the power house has only been partially decided upon and provided for. The east half of this plant will be equipped by the Union Carbide Co., and the west section by the Michigan Lake Superior Power Co. The apparatus will be such as may be decided on to be the most efficient for the service required. So far, dynamos sufficient to generate 8,000 horse power have been contracted for with the Stanley Electric Manufacturing Co., of Pittsfield, Mass., and are now being installed. The power will be distributed electrically to manufacturing establishments in the vicinity and contracts that have been made will require a large part of the entire output of power.

The Consolidated Lake Superior Co. for seven years has had a hydraulic power plant on the Canadian side which generates 20,000 horse power. It is estimated that their total horse power (80,000) is about one-half the minimum aggregate horse power that is available. To prevent the lowering of Lake Superior the Government has caused to be built compensating works at the head of the rapids in St. Mary's River on the Canadian side at Sault Ste. Marie, Ont. They are intended to equalize the flow of water in the river to compensate for the volume of water flowing through the canal of the Michigan Lake Superior Power Co. This consists of a breakwater 1,000 feet long out from the Canadian shore at the end of which four steel gates have been constructed 48 feet long and 15 feet high, operated between masonry piers with a superstructure of steel, and beyond these gates a submerged dam will be carried for a distance of about 500 feet.

This power plant is but one of the various undertakings of the Consolidated Lake Superior Co. Many millions of dollars have already been spent, and there is no telling where this vast development being conducted by the Clergue Syndicate, for that is what it is called, will cease. Some of the work completed and under construction is, briefly, as follows:

Completed and in Operation.

Algoma Central & Hudson Bay Railway: In operation, 68 miles; sidings and terminal yards, 32 miles; total number of cars, 739; locomotives, 14; four owned steamships, each 9,150 tons; three owned ore-carrying barges of 10,400 tons; four chartered ore steamships of 17,300 tons; two chartered ore-carrying barges of 8,950 tons; three passenger and freight steamers.

Algoma Steel Co., Ltd.: The Bessemer steel works and rail mill now in operation constitutes a thoroughly modern and well equipped plant. Its converting capacity is sufficient to produce 600 tons of Bessemer steel ingots daily, while the blooming mill and rail mill will finish from 1,000 to 1,200 tons per day.

Lake Superior Power Co.: Water power canal, 20,000 h.p.; Helen iron ore mine on Michipicoten range; Gertrude nickel mine in Sudbury district; Elsie nickel mine in Sudbury district; one 20-ton nickel smelter at Gertrude mine; ferro-nickel plant for roasting and briquetting nickel ore; sulphurous acid plant at Sault Ste. Marie, Ont.

Algoma Commercial Co., Ltd.: Extensive logging operations at numerous points on company's land grant; saw, lath and shingle mill on Goulais River; sawmill at Sault Ste. Marie, Ont.; sale and settlement of company's lands.

Tagona Water & Light Co.: Water, electric light and electric power service to the town of Sault Ste. Marie, Ont.

Sault Ste. Marie Pulp & Paper Co.: Ground wood pulp mill, daily capacity 100 tons; sulphite pulp mill, daily capacity 60 tons.

Algoma Iron Works: Fully equipped foundry, forge and machine shop.

Under Construction.

Algoma Central & Hudson Bay Ry.: Grading completed for 123 miles.

Algoma Steel Co., Ltd.: One charcoal blast furnace at Sault Ste. Marie, Ont.; one coke blast furnace at Sault Ste. Marie, Ont.

Lake Superior Power Co.: By-product charcoal plant of 20 retorts at Sault Ste. Marie, Ont.; 56 beehive kilns at various points on Algoma Central & Hudson Bay Ry.; two 20-ton nickel smelters in Sudbury district.

Algoma Commercial Co., Ltd.: Josephine iron ore mine on Michipicoten range, under development.

International Transit Co.: Street railroad in Sault Ste. Marie, Ont.

Trans-St. Mary's Traction Co.: Street railroad in Sault Ste. Marie, Mich.

Manitoulin & North Shore Ry.: Negotiations have just been concluded for the establishment of large electrolytic refining works at Sault Ste. Marie, Ont., which will require an additional supply of ore from the nickel mines and matte from the smelters to be reduced into metallic nickel and copper.

The rail mill referred to above has only been in operation for a few months, and it rolled the first rail in the Dominion made from Canadian Bessemer steel, made from Canadian pig from Ontario ore.

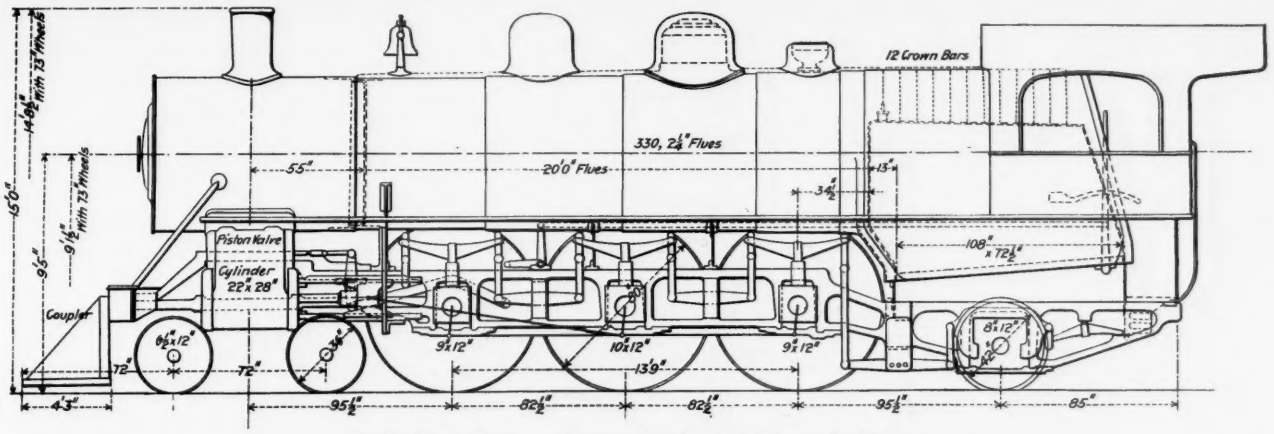
All this vast enterprise has been carried on under the direction of Mr. F. H. Clergue. H. von Schoen is chief engineer. The officers of the Consolidated Lake Superior Company are:

President, E. V. Douglas; Vice-President and General Manager, F. H. Clergue; Vice-Presidents, F. S. Lewis and Edward C. Lee; Vice-President and Treasurer, T. C. Search; Secretary and Assistant Treasurer, W. P. Douglas; Assistant Treasurer, W. K. Stager; Assistant Secretary, E. H. Sanborn. The directors are: E. J. Berwind, James Butterworth, E. V. Douglas, John S. Freeman, E. C. Lee, Charles E. Orvis, S. M. Prevost, T. C. Search, H. A. Berwind, F. H. Clergue, W. P. Douglas, Lynde Harrison, F. S. Lewis, George Philler, Samuel Rea, James S. Swartz.

Heavy Pacific Type Locomotives for the Chicago & Alton.

Two very large passenger engines of the 4-6-2 wheel arrangement, and called by the Baldwin Locomotive Company the "Pacific type," have been ordered from that company by the Chicago & Alton. In our issue of Aug. 1, 1902, we described several engines of similar wheel arrangement which had been built for the Chesapeake & Ohio and the Missouri Pacific by the American Locomotive Company. These new engines are simple, and have cylinders 22 in. x 28 in., with piston valves, and are designed for 220 lbs. working steam pressure. Notable features of these engines are the very large heating surface of 4,064 sq. ft. and the 330 20-ft. tubes, 2¼ in. in diameter. One will have 80 in. and the other 73 in. drivers, the latter to be provided with a traction increaser.

The total weight of the first is 230,000 lbs., and of the second 236,000 lbs., while the weights on drivers are 144,000 lbs., and 142,000 lbs. respectively. In point of total weight, and weight on drivers, these locomotives surpass anything so far built for passenger service. The average ratio of heating surface to the weight on drivers is 1 to 31. The tank has a capacity of 8,400 gallons, and is fitted with the Lindstrom siphon device. The firebox is 108 in. long and 72½ in. wide, and has two doors. The grate area is 54 sq. ft. The special equipment includes Pyle-National electric headlights, Westinghouse friction draft gear on tender, Otis steel axles, National Hollow brake-beams, Streeter steel back brake-shoes, Tower couplers, Ohio injectors, Leach sanding devices and bronze babbitt-faced journal bearings.



Pacific-Type Passenger Locomotive for the Chicago & Alton.
Built by the BALDWIN LOCOMOTIVE WORKS, *Philadelphia Pa.*

Train Accidents in the United States in September.[1]

bc, 1st, Chicago, Rock Island & Pacific, Birmingham, Mo., butting collision of freight trains wrecking both engines and many cars of cattle. Both enginemen and both firemen were killed and three other trainmen were injured.

[1]Accidents in which injuries are few or slight and the money loss is apparently small, will as a rule be omitted from this list. The tabular record of totals is no longer kept, as a more complete report of the total number of accidents is published by the Interstate Commerce Commission. The classification of the accidents is indicated by the use of the following

ABBREVIATIONS.

rc	Rear collisions.
bc	Butting collisions.
xc	Miscellaneous collisions.
dr	Derailments; defect of roadway.
eq	Derailments; defect of equipment.
dn	Derailments; negligence in operating.
unf	Derailments; unforeseen obstruction.
unx	Derailments; unexplained.
o	Miscellaneous accidents.

An asterisk at the beginning of a paragraph indicates a wreck wholly or partly destroyed by fire; a dagger indicates an accident causing the death of one or more passengers.

*unx, 1st, Southern Railway, Berry, Ala., an excursion passenger train was derailed from some cause not yet explained and the engine and six cars fell down a bank. Twenty-two passengers, the trainmaster of the division, who was riding on the engine, and the engineman, 24 persons in all, were killed, and the fireman and 75 passengers were injured. The passengers who were killed were riding on the platforms of the cars, although the train, as we are informed by an officer of the road, was not overcrowded.

bc, 2nd, 5 a.m., Wabash Road, Peru, Ind., butting collision between an eastbound passenger train, drawn by two engines, and a westbound freight. One engine was overturned. There was a dense fog at the time.

xc, 2nd, Delaware & Hudson, Glens Falls, N. Y., a passenger train drawn by two engines collided with a car of lumber which had escaped control on a grade, and one engine was derailed and overturned. One engineman was injured, probably fatally.

dr, 2nd, 9 p.m., Gulf, Colorado & Santa Fe, Brownwood, Texas, a westbound passenger train was derailed by a broken rail, and the entire train fell down a bank. Forty-one passengers and three trainmen were injured, one of the passengers fatally.

eq, 3rd, Boston & Maine, South Keene, N. H., a freight train was derailed, presumably by a broken axle, and eight cars were wrecked. A brakeman was killed.

xc, 4th, Pennsylvania Road, West Brownsville, Pa., a freight train ascending a grade broke in two, and the rear portion ran back several miles and into the head of a following freight, making a bad wreck. Two trainmen were killed and one was injured.

xc, 4th, 4 a.m., Southern Pacific, West Oakland, Cal., engine 2,105 stood in front of the coal chute, with fires banked, when a yard engine, switching, kicked some cars against it, knocking the lever into the forward motion, and jarring the throttle open. The engine started off, crossing two switches and headed for the mole. A towerman thinking she was on her way for service, set the switches for the passenger station, but as she passed he noticed that she was running away. He telephoned to the next towerman, who had but a moment to decide whether to head her into a string of coaches, or into the bay. He chose the latter, and the next day the wrecking crew had to fish for an engine.

*4th, Charleston & Western Carolina, Greenwood, S. C., freight train No. 17 was derailed and eight cars were wrecked and destroyed by fire. Three trainmen were injured.

unx, 4th, Northern Pacific, Trout Creek, Mont., passenger train No. 3 was derailed and the engine and four cars were ditched. The engineman and a brakeman were killed and the fireman and a tramp were injured.

xc, 4th, New York Central & Hudson River, Keating, Pa., collision of freight trains, wrecking one locomotive and seven cars. A small station building was destroyed, and a water tank caught fire from the wreck and was burnt up. One brakeman was killed and two other trainmen were injured.

unx, 4th, Vicksburg, Shreveport & Pacific, Bodcau, La., a westbound freight train was derailed and nine cars broke through a trestle bridge. Two tramps were killed.

eq, 5th, St. Louis, Iron Mountain & Southern, O'Kean, Ark., a freight train was derailed by a broken journal and several cars were wrecked. Three trespassers, riding in a car of wheat, were smothered to death.

bc, 6th, St. Louis & San Francisco, Black Rock, Ark., butting collision of freight trains, wrecking both engines and seriously injuring one engineman. It is said that one of the conductors misread an order.

xc, 7th, Pennsylvania Road, Frugality, Pa., a number of cars belonging to a freight train escaped control on a grade and ran at high speed several miles and collided with another freight which was switching, wrecking two engines and 11 cars. Two brakemen riding on the runaway train made heroic efforts to stop it, but were unsuccessful, and both of them were killed.

unf, 7th, Norfolk & Western, Glasgow, Va., passenger train No. 3 was derailed and the engine and first four cars were overturned and ditched. The engineman and fireman were injured, the former fatally. The derailment was caused by a spike placed on the track by a boy of 11 years.

xc, 8th, Chicago, Burlington & Quincy, Broken Bow, Neb., collision between a passenger train and a freight, badly damaging both engines and several freight cars. A man riding on the tender of the passenger engine was killed and two trainmen and one passenger were injured.

unx, 8th, Union Pacific, Castle Rock, Utah, a sleeping car in a westbound passenger train, running at full speed, was derailed and was dragged nearly a mile on the ties. The repairing of the track delayed all trains about seven hours.

unf, 10th, 11 p.m., Louisville, Henderson & St. Louis, Worthington, Ky., a freight train was derailed by running over a bull, and the engine and 10 cars were wrecked. The engineman was killed and a brakeman was fatally injured.

unx, 10th, Central of New Jersey, Tamaqua, Pa., a freight train was derailed and four cars fell through the high bridge over the Schuylkill, lodging about 150 ft. below the track. Four painters at work on the bridge were killed.

unx, 10th, Wisconsin Central, Hancock, Wis., the locomotive of a freight train was derailed and the en-

gineman and two other trainmen were injured, the engineman fatally.

*xc, 11th, Southern Railway, Burgin, Ky., a freight train ran over a misplaced switch and into another freight standing on a side track, wrecking several cars. The wreck took fire and two cars were burnt up. One fireman was fatally injured.

*xc, 13th, 5 a.m., Atchison, Topeka & Santa Fe, Struby, Colo., 18 cars of a freight train became uncontrollable on a grade and collided with a passenger train, wrecking the two passenger engines and many freight cars. The wreck took fire and was mostly burnt up. Three trainmen were killed and three others injured.

xc, 14th, Missouri, Kansas & Texas, South McAlester, Ind. T., collision between a passenger train and a locomotive, wrecking both engines, one mail car, one baggage car and one passenger car. One engineman was killed and one fireman was fatally injured.

o, 14th, Pennsylvania Road, Jersey City, N. J., the locomotive of a freight train was wrecked by the explosion of its boiler. The engineman was killed and the conductor and fireman were injured.

bc, 16th, 1 a.m., Louisville & Nashville, Siluria, Ala., butting collision of freight trains, wrecking four cars. One fireman was killed and five other trainmen were injured. It is said that the collision was due to a mistake in telegraphic orders.

bc, 17th, Cincinnati, New Orleans & Texas Pacific, Coulterville, Tenn., butting collision between a passenger train and a freight, badly damaging two engines. One trainman was injured.

bc, 17th, Choctaw, Oklahoma & Gulf, Little Rock, Ark., butting collision between a special passenger train and a freight, badly damaging two engines, one passenger car, one baggage and four freight cars. Two trainmen were killed, and several soldiers among the passengers were injured.

rc, 18th, Pennsylvania Road, Sligo, Pa., an empty engine ran into the rear of a preceding freight train, wrecking the caboose. A brakeman was killed. There was a dense fog at the time.

*bc, 18th, Northern Pacific, Tacoma, Wash., butting collision of freight trains, wrecking several cars. One trainman was killed and two were injured. The wreck took fire and was mostly burnt up.

xc, 18th, Philadelphia & Reading, Sunbury, Pa., a freight train descending a grade broke in two, and the rear portion afterward ran into the forward one, wrecking four cars. Four trespassers were injured, two of them fatally.

eq, 18th, San Antonio & Aransas Pass, Edgar, Texas, a car in a mixed train broke down, and, with several other cars, was wrecked. One passenger was injured.

dn, 18th, Baltimore & Ohio Southwestern, Leesburg, Ohio, eastbound passenger train No. 2 was derailed by running over a misplaced switch at high speed, and the engine and first three cars were wrecked. The boiler of the engine exploded and the engineman and fireman were killed. Forty passengers were injured. It is said that the switch had been left wrong by a freight train, which had passed in the opposite direction a short time before. According to reports, the man in charge of the freight requested the station operator to attend to the switch, while the latter declares that he did not assume the responsibility. The approaching passenger train had a view of the switch, showing a red light, for a full mile before reaching it. It is also said that the engineman gave the usual whistle signal approaching the station, which would seem to indicate that he was not asleep.

unx, 18th, Chicago, Milwaukee & St. Paul, Milwaukee, Wis., passenger train No. 22 was derailed; a man riding on the baggage car buffer was killed, and four trainmen were injured.

rc, 19th, Northern Pacific, Covington, Wash., passenger train No. 6 ran into the rear of preceding passenger train No. 4, wrecking a mail and baggage car at the rear end of No. 4. Two mail clerks and one express messenger were injured.

bc, 19th, Pittsburgh & Western, Witmer, Pa., butting collision of passenger trains, wrecking both engines and both baggage cars. Five trainmen were killed and two trainmen and several passengers were injured. It is said that one of the two main tracks was temporarily being used a single track, and that the collision was due to the failure of some one to notify the interior train.

†rc, 20th, 5 a.m., Choctaw, Oklahoma & Gulf, Choctaw, Okla. T., a freight train ran into a preceding train carrying a circus, and two sleeping cars were wrecked. Two circus men were killed and 26 were injured.

*rc, 21st, 11 p.m., Pennsylvania Road, Conemaugh, Pa., a freight train ran into the rear of a preceding freight, wrecking the engine and 13 cars. The wreck took fire and was partly burnt up; a fireman was killed.

o, 21st, Southern Pacific, Acton, Cal., the locomotive of a freight train was wrecked by the explosion of its boiler; the engineman and fireman were killed and two other trainmen were injured.

rc, 22d, Norfolk & Western, Bluefield, W. Va., a freight train ascending a grade, with an engine pushing behind the caboose, was run into at the rear by a following freight, and the pushing engine, caboose and several cars were badly damaged; a brakeman in the caboose was killed.

unx, 22d, Illinois Central, Boaz, Ky., a freight train was derailed and 17 cars were ditched. A man riding on one of the cars was killed.

unx, 22d, Burlington & Missouri River, Nelson, Neb., a mixed train was derailed and two passenger cars were ditched. Four passengers were injured.

unx, 22d, 11 p.m., Missouri, Kansas & Texas, Woodbine, Texas, a freight train was derailed and seven cars of cattle were wrecked; a brakeman was injured.

bc, 23d, 4 a.m., Southern Pacific, Tonka, Nev., butting collision between passenger trains No. 1 and No. 2, badly damaging both engines. The engineman of the eastbound train was killed and two firemen were injured. The westbound train was standing at the station and the eastbound should have entered the side track before reaching the station.

bc, 24th, Pittsburgh, Cincinnati, Chicago & St. Louis, Morrow, Ohio, butting collision of freight trains, one of which had become uncontrollable on a descending grade; both engines were wrecked and one fireman was killed.

o, 24th, Denver & Rio Grande, Monument, Colo., the locomotive of a freight train was wrecked by the explosion of its boiler, and the engineman and fireman were killed.

†rc, 25th, Chicago, Burlington & Quincy, Malden, Ill., a passenger train ran into the rear of a preceding freight, wrecking the caboose. Four drovers were killed and three were injured.

bc, 25th, Bessemer & Lake Erie, Pardoe, Pa., butting collision of freight trains, one of which was drawn by two engines; both engines and 12 steel coal cars were wrecked. Four trainmen were killed and three injured. It is said that there was a mistake in, or misunderstanding of, telegraphic orders.

xc, 25th, 5 a.m., Pennsylvania Lines, Kenwood, Pa., collision of freight trains, wrecking two engines, one of which fell down a bank and badly damaged a dwelling house. One fireman was injured.

rc, 26th, New York, New Haven & Hartford, Pelham Manor, N. Y., an empty engine ran into the rear of a preceding freight, damaging the caboose and killing the conductor.

xc, 26th, Northern Pacific, Livingston, Mont., a freight train which had become uncontrollable on a steep grade collided with a standing locomotive, making a bad wreck. The engineman of the standing locomotive was killed and the fireman was fatally injured. The fireman of the runaway engine was asleep on his engine, and was not awakened until thrown out of his cab by the collision.

unx, 26th, Southern Indiana, Elnora, Ind., a work train was derailed and the engine, tender and caboose fell down a bank; seven employees were injured.

xc, 27th, 1 a.m., Union Pacific, Rawlins, Wyo., an eastbound fast freight approaching the station at uncontrollable speed, collided with a switching engine, wrecking both engines and 14 cars. The wreck took fire and seven of the cars were burnt up. Three trainmen and a tramp were killed.

unf, 27th, Yazoo & Mississippi Valley, Arnold, Miss., a freight train was derailed by running over a cow, and the engine was overturned. The fireman was killed and the engineman injured.

bc, 28th, Wabash Road, Crocker, Ind., butting collision between a passenger train and a freight, badly damaging both engines and one baggage car.

unx, 28th, Southern Railway, Coosa, Ga., a mixed train was derailed and a passenger car and two freight cars were overturned; one trainman was killed.

rc, 29th, Norfolk & Western, Montgomery, Va., a freight train ran into the rear of a preceding freight, wrecking the caboose and six cars. Two trainmen were killed and one was injured. It is said that an operator delivered a telegraphic order incorrectly written.

xc, 29th, Baltimore & Ohio, Oakland, Md., a freight train descending a grade broke in two and the rear portion afterward ran into the forward one, which, it is said, had been stopped because the "train parted" signal had been misunderstood. Three cars were wrecked and two trainmen were injured.

29th, St. Louis & San Francisco, Thompson, Ark., a freight train was derailed and the engine and several cars were badly damaged. The fireman was killed and the engineman fatally injured.

unx, 29th, Atchison, Topeka & Santa Fe, Osawkie, Kan., a mixed train was derailed and three freight cars and two passenger cars were ditched. Two passengers were injured.

unx, 29th, Chicago, Rock Island & Pacific, Metz, Iowa, a car in a freight train was derailed and the train broke through a bridge; 12 cars fell into the water below.

bc, 30th, Gulf, Colorado & Santa Fe, Thackerville, Ind. T., butting collision of freight trains; one fireman killed and one engineman injured.

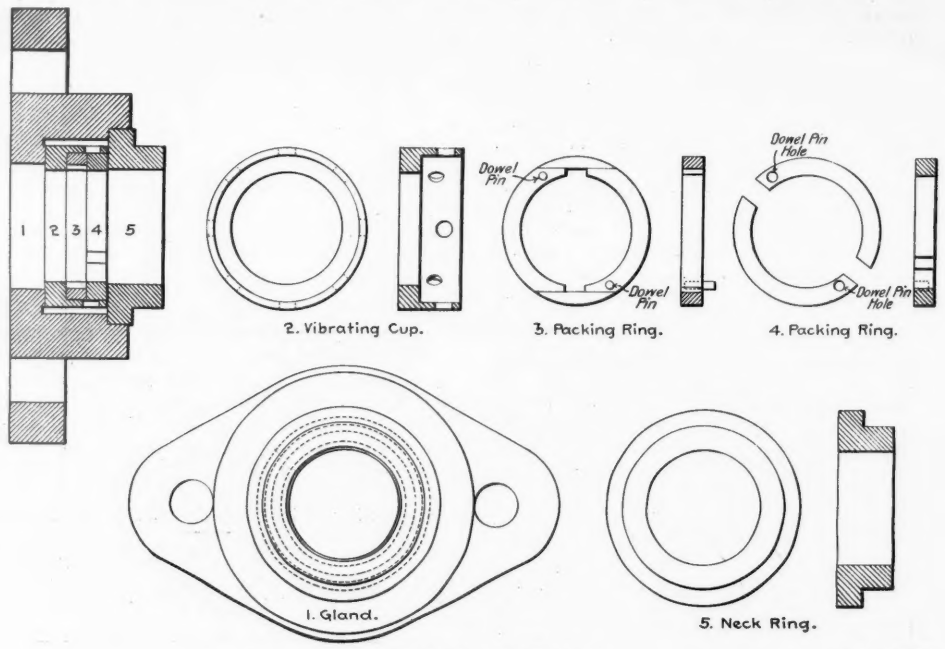
30th, Gulf, Colorado & Santa Fe, Gainesville, Texas, butting collision of freight trains; two engines and many cars wrecked. The wreck took fire and 20 loaded cars were burnt up. One trainman was killed and six were injured.

unx, 30th, Texas & Pacific, Bolton, Texas, a car in a freight train was derailed while crossing a bridge, and, with several other cars, broke through.

The Smith Metallic Packing.

A new metallic packing, the leading feature of difference of which from other similar packings lies in the use of brass or cast-iron instead of babbitt for the packing rings, has been devised by Thos. Smith, who is connected with the mechanical department of the Mexican Central.

As will be seen from the illustrations, it is simple and of few parts and has no springs or tapered cones in its construction. The list of parts comprises a cast-iron gland, a brass or cast-iron neck-ring, a brass vibrating cup and two brass or cast-iron packing rings. In the sectional view of the packing applied, the parts are numbered, and in the detailed views the names of these numbered parts are given. In applying the packing no change in cylinder heads, stuffing boxes or other parts is required, except the gland on locomotives. And after the packing is once in place it is claimed that the only renewals that will ever be necessary are the packing rings, and these are readily and cheaply replaced.



The Smith Metallic Packing.

Referring to the illustrations, Nos. 3 and 4 are the packing rings. No. 3 is composed of four pieces, with the ends of the larger segments separated, the openings being bridged by the smaller segments. Each of the larger segments has a dowel pin in it as shown. No. 4, called the port ring, is made in two segments, each slightly less than half the circumference, and is provided with dowel pin holes into which fit the dowel pins of No. 3, the relative positions of the two rings being as shown by the drawing.

The vibrating cup, No. 2, is made of brass and is provided with port holes as shown, the packing being set up by the pressure of the steam or other fluid. This cup is also made in halves, which are securely screwed together, it being possible by this arrangement to remove this cup, should it become necessary, without having to disconnect the rod.

The neck-ring is cast-iron and is made from $^3/_{16}$ to ¼ in. larger than the diameter of the rod (depending on conditions) in order to admit the steam or other pressure to the packing rings; there is, therefore, no wear whatever on the neck-ring. The packing rings are from ⅜ in. to ⅝ in. square, according to requirements, and are lathe turned. All of the contact surfaces in a vertical plane have ground joints.

As the rings are set up by the steam or other fluid pressure, it will be seen that they only bind the rod when the pressure is on that end of the cylinder and there is, therefore, practically no friction when the piston is moving backward. When used on steam cylinders no lubrication of the packing is necessary, as it usually receives sufficient oil from the steam. It is claimed that the packing has a rotary motion which serves to keep the rod round and smooth and in otherwise first class condition; that it is not affected by bad water, and that it will give several days warning before necessary to renew; also that it will neither stick nor blow out.

This packing has been thoroughly tested in all kinds of service by the Mexican Central for more than two years past, and it has now been adopted as the standard of the road.

A company known as the Smith Metallic Packing Co., headquarters in Chicago, has been formed for its manufacture and sale, and at present has it applied on trial on locomotives of a number of the most prominent western roads.

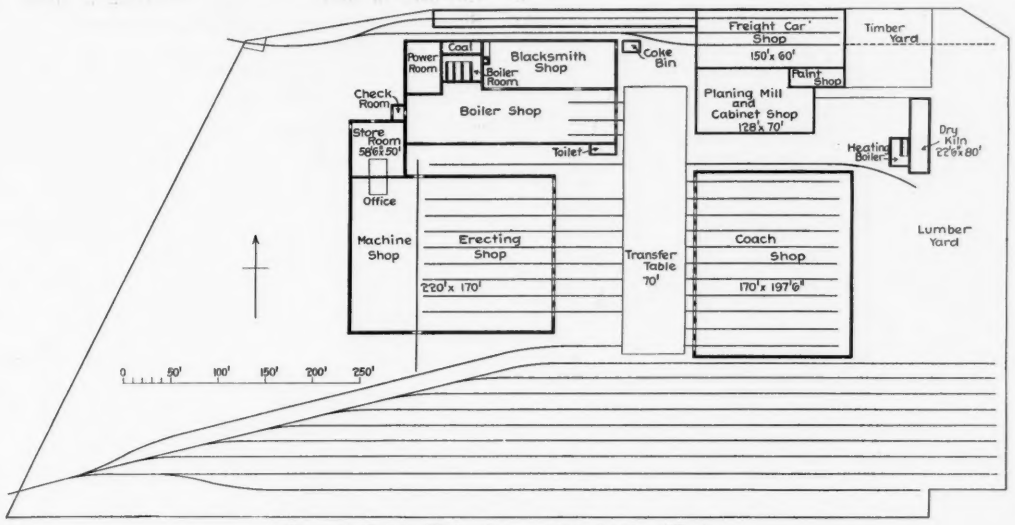
The Hicks Car and Locomotive Works.

We give herewith some views of the Hicks Car & Locomotive Works at Chicago Heights, Ill., which have recently been added to and are being improved to an extent that will make of them practically a new plant.

It has been only about five years since Mr. F. M. Hicks embarked in the business of buying and selling second-hand locomotives and cars, and at the outset his practice was to have such equipment put in order at the shops of the road from which purchased. This arrangement was unsatisfactory and it was decided that an individual plant would be necessary to carry on the business satisfactorily; consequently land was acquired and buildings erected at Chicago Heights. The beginning was quite modest, the buildings being frame, and very small. The rapidity with which the business has grown is well indicated by the extent and nature of the buildings of the present plant, comprising, as they do, 150,000 sq. ft. of floor space, or nearly 3½ acres, while the employees number something like 500. There are two miles of track in the plant and a capacity for 150 freight cars, 28 coaches and 24 locomotives. The annual output of rebuilt freight cars amounts to about 2,000, of passenger coaches 100, and of locomotives 140.

In addition to putting in order all equipment bought and sold by F. M. Hicks, repairs are made to cars and locomotives belonging to corporations or to private owners having no shop facilities for such repairs. Also equipment from special designs is built for parties desiring same.

The accompanying general plan shows the relation and dimensions of the various buildings and the perspective view gives a good idea of the nature of these buildings. All of them, with one or two exceptions, are brick, of substantial construction, and when the improvements above alluded to are completed they will be modern in all their appointments.



General Plan—Hicks Locomotive & Car Works.

The present improvements include the lighting and driving of the shops by electricity. In the power station are two generating units composed of tandem-compound 100-h.p. Ball engines belted to 75-k.w. Bullock generators. The Edison three-wire system of distribution is used. An Ingersoll-Sergeant two-stage compressor having a capacity of 600 cu. ft. per minute supplies air for the various hoists and pneumatic tools throughout the plant. Steam is supplied by two 72-in. x 16-ft. horizontal tubular boilers built at the shops, and space is provided for one more. These boilers are equipped with Hawley down-draft grates and an induced draft system, producing practically smokeless combustion. The working pressure of the boilers is 135 lbs., although they are designed for 160 lbs.

The machine and erecting shop is 170 x 220 ft., and the former has two floors. Views of each of these shops are shown. The view of the machine shop gives a good idea of the nature of the installation and the kind of equipment. However, additions in the way of larger new tools are to be made and all tools will be group-driven from electric motors. The photograph shows the shop to be well lighted. The second floor of the machine shop is used for the brass work, the tin shop and the pattern shop. Also the electrical engineer of the plant has his room on this floor.

The erecting shop is divided into five bays having eight tracks and space for 24 locomotives. Four of these bays are used for erecting work and the fifth is devoted to tender and cab work. The four erecting bays are to be served each by a 10-ton electric traveling crane. To supplement these cranes in lifting locomotives, boilers, etc., four portable telescoping pneumatic jacks are used, having a total lift of 27 in. Pneumatic hoists are also provided at various points, where necessary. It is the practice when a locomotive comes in for rebuilding, to strip it and send the parts to the different departments for attention whether actual repairs are necessary or not. In this way every part of the rebuilt engine is subjected to careful inspection.

The boiler shop is well equipped with modern tools, including a Scully 3-ft. combination punch and shear, and a Scully flange punch; 8 ft. bending rolls; 10 ft. air clamp; a flue welder capable of handling 400 flues in 10 hours; and an automatic reamer and scarfer in connection with a flue cutter. There is also an ample supply of pneumatic tools.

The blacksmith shop has 11 fires and four furnaces. The tool equipment includes two bolt headers, power bar shear, Sellers combination round-iron and plate shears, and a new Baudry steam hammer. A Bradley hammer and another new steam hammer are to be installed.

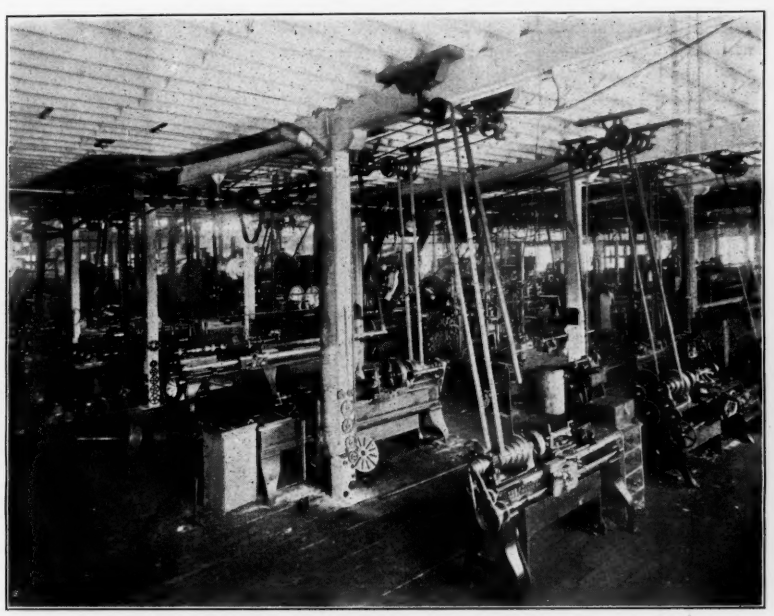
The planing mill and cabinet shop is supplied with all of the necessary tools for dressing lumber, making moulding, and otherwise preparing and finishing material for use in cars. In addition to the usual outfit of circular and band saws, timber dressers, borers, etc., there is a 40-in. "Royal Invincible" Berlin Machine Works sander; a combination borer and mortiser; a two-spindle horizontal shaper; a 6-in. sticker; another sticker or moulding machine; an 8-in., four-sided tool, is to be added. The freight car shop has some heavy tools, including a 36-ft. Daniels car sill planer, a heavy car sill gainer, a combination double-spindle borer and mortiser, and other tools for heavy sill work.

The coach shop, of which an interior view is shown, is a large, light and very attractive shop, 170 x 200 ft. There is track room for 28 coaches and the interior is flooded with light through numerous skylights of translucent fabric. The coach and locomotive shops are served by a 70-ft. transfer table, whose travel also enables it to serve the boiler shop. The electrical operation of the plant is to be made to include this table.

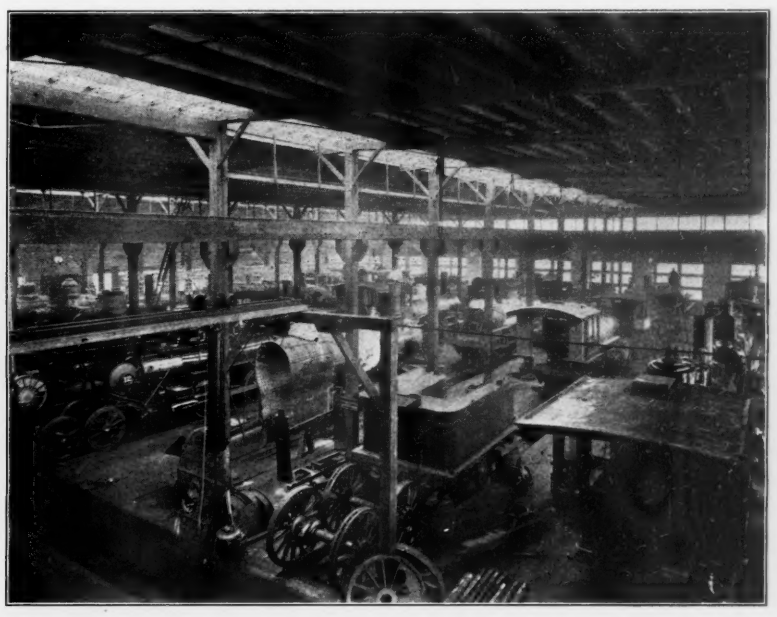
Probably the most important work done in the coach shop is the building of private cars, much of which has been, and is now being done; in fact, at the present time five of these cars are under way or have just been turned out for railroads or private owners.

One of the improvements under way is a dry kiln, and a heating plant for heating the kiln and coach shop; the building is brick. The heating systems for the other shops is a hot blast system, one of the ducts for which is to be seen in the view of the machine shop.

The only department usually a part of such shops, not found here is a foundry. At present all of the patterns for all brass and iron castings are made at the works, and the castings from these are bought outside. Mr. Hicks has offices in the Fisher Building, Chicago.



Machine Shop—Hicks Locomotive & Car Works, Chicago Heights, Ill.



Locomotive Erecting Shop.

View of Hicks Locomotive & Car Works, Chicago Heights, Ill.

Foreign Railroad Notes.

A through train daily is to run the coming winter between Paris and Berlin. Heretofore passengers by this train have had to change cars in Cologne, and the only through cars between the two capitals were those of the International Sleeping Car Co., in which the passenger pays first-class fares and a premium besides. As now arranged there will be first and second-class compartments between Paris and Berlin, and also third-class in the same train between Cologne and Berlin.

The new German railroad in China in August had traffic interrupted by floods for two weeks, and two spans of the longest bridge on the line were carried away.

A French Senator who asked the Minister of Commerce why the French mails to Cochin China were not despatched by way of the Siberian Railroad, instead of by sea, was informed that though the Russians send their own mails to the Pacific by railroad, they declare that the Siberian Railroad is not yet ready to undertake this service for other countries. He might have added that from the Pacific terminus of the Siberian Railroad to French Tong-king is some 2,000 miles by sea, with no regualr steamer connection.

RAILROAD GAZETTE

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EDITORIAL ANNOUNCEMENTS.

CONTRIBUTIONS—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussion of subjects pertaining to ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

ADVERTISEMENTS—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and these only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially either for money or in consideration of advertising patronage.*

Man's Natural Right to Have Anthracite Coal.

In the last days of the anthracite coal strike a queer theory came to the surface and was often seen in the papers and heard from the pulpit. Briefly, it was that mankind has a natural right to the coal in the anthracite fields, and that the owners of those fields should dig and ship coal, or the government should take possession and work the mines. We have not heard that the miners should be made to work or go to prison, but that is an essential part of the theory. A week or two ago the *Iron Age* paid attention to this notion in a sagacious editorial article. The editor says:

> Lately the claims of a third party have been pushed forward vigorously and the situation has been seriously complicated thereby. The doctrine is advanced that the public, or the consumer, has paramount rights which both labor and capital must bow to. As a matter of fact, the public, or the consumer, has no abstract right as a party in industrial production. So long as private property is sacred, so long, for instance, as the mineral wealth is an appendage of surface ownership, just so long it is not a matter of right for the consumer to demand that minerals be extracted in his interest. One may hold, as many governments do, that mineral ownership is divorced from surface ownership and is the property of the State, but that is another matter.
>
> But, while the public, or the consumer, has not an abstract right, it must be recognized that the public has the might, and prudent men will act accordingly, as the coal operators have done. The intervention in the anthracite coal strike of the President of the United States has been an act backed by that might and as such must be deplored, whatever the outcome may be.
>
> The producer is not enjoying any special privileges from the State, and therefore he has no duties to it like the railroads with their charters and their powers of eminent domain. Yet any manufacturer is guided in the policy which he pursues very largely by the requirements of his customer, the consumer or the public, as the case may be. The success of business management largely rests upon a judicious handling of the interests of the consumer, which the labor union is never mindful of. The history of industrial contests has again and again shown how reckless labor unions are even of the sufferings of fellow workmen in collateral or dependent callings.
>
> The issues of the anthracite coal strike have been warped by sentiment, honestly sympathetic we believe in most cases, but wofully mistaken. The contest has been characterized by an abuse of power with which there has been endless temporizing when an emphatic reminder of submission to fundamental and paramount duties should have been the very first consideration, irrespective of the convenience or even the suffering of the public.

This theory of the natural right of man to the soil and to the minerals beneath the soil is not new. It has, in late years, been made familiar by the clear and earnest writings of Henry George; but it goes much farther back. For centuries it has been advocated and refuted by men of far greater learning and mental power than Mr. George possessed.

Few of us have time to read or think much of such philosophical subtleties, and time so spent would be wasted for most of us, for mankind will go along as it always has gone, creating the facts of philosophy and paying little attention to philosophical theories or to the laws which philosophers think they have discovered. But a very little reading will be quite sufficient, if it is of the right kind. If a man will read three or four times, and will meditate over Huxley's essay on "Natural Rights and Political Rights," he will get a set of ideas that will keep him from going far astray on this subject, if he has natural intelligence and a reasonable mind; without these gifts he will go astray anyway.

In Huxley's brilliant essay we learn that sixteen centuries ago Ulpian drew the conclusion that according to natural law, the elements, the sea, the air and the shore are the common property of all living things. Observe, he does not say of man alone; but Ulpian did say that by the law of nature all men are equal and free. Every intelligent man knows that Rousseau based his political philosophy on the doctrine of natural rights, and those who have read Rousseau and Henry George know that in principle their teachings are identical.

Quesnay, the physician of Louis the Fifteenth, defined natural right as "the right which a man has to the things which are fit for his enjoyment." This is a simple proposition. According to it I may possess myself of any means of enjoyment under the law of natural rights. To be sure, Quesnay, if cornered, might have quibbled out of his trouble on the word "fit." But Quesnay was not so addle-pated as are some of those who have attempted to follow him in recent years, for he said that "the natural right of man is the right which nature teaches to all animals," and, also, that "the natural right of man is the right which his strength and his intelligence assure him." But then he plunges us into no end of trouble by saying that "the natural right of man is the unlimited right of all to everything," but, further, he says that "the natural right of man is a right limited by a tacit or explicit convention." Here he discerns the real fact, and he adds a further gleam of light in saying that "natural right has nothing to do with either justice or injustice."

Huxley, with his fine gift of humor and his keen insight, illuminates the situation by asking us to consider the tiger, which is as perfect a butchering machine as could be devised. If nature intended a tiger to do anything at all it must have been intended to perform exactly that butcher's work which it does so well. Then, if we think further, we must conclude that, as the French "friends of men" might have said, tigers are charged with their own preservation under penalty of death. We must admit that a tiger has a natural right to eat a man. "But, if he may eat one man, he may eat another, so that a tiger has a right of property in all men as potential tiger meat. Men are as much the 'gratuitous offering of nature' to tigers for their subsistence, as fruits are to men. But, any one tiger has no more natural right of property in man than any other tiger. All tigers are free to eat any man they can seize; and if two tigers are sneaking through the jungle on opposite sides of a foot-path, their rights to the villager who, traveling thereby fondly imagines he is going home, are equal. So that we may safely enunciate the conclusion that all tigers have an equal natural right to eat all men."

But, if a tiger has a natural right to eat me, have I a natural right to defeat nature by shooting him? If I am endowed with those faculties which make rifles, and with even more cunning than the tiger, all this endowment too must have come through the working of the laws of nature, and, in shooting the tiger I should be exercising my natural rights. The way out of this dilemma is suggested by the thought that these natural rights of tigers and men are "rights to which no duties correspond—rights of which the exercise may be impeded or prevented without the perpetration of wrong, and this is just the difference between 'natural laws and rights' on the one hand, and 'moral and civil laws and rights on the other hand.'" Thus, the so-called natural rights are merely statements of facts as they exist, and they are quite different from moral and civil laws which carry with them penalties. The confusion of thought arises from the failure to make this discrimination.

And now let us apply this analysis to the question of men's natural right to have anthracite coal. One hundred years ago the use of anthracite coal was unknown except in smiths's furnaces and a few forges. That "gratuitous offering of nature" lay in the earth unheeded by nature's stupid children. Up to 1808 all effort to burn "stone coal" in the Wyoming Valley, without an artificial blast had failed. There was no outside market for the product of the mines of the valley. Certain men of sense and enterprise risked their time and their money in demonstrating the uses of hard coal, and in floating it down the Susquehanna River to try to find a market. At first, they not only risked their time and money, but lost. Precisely the same was the case with the Schuylkill region and the Lackawanna region. The men who tried to float coal down to market not only failed to sell their coal but were sometimes arrested as impostors, and their coal was used for gravel walks. One well-informed writer says "no other product of the globe which has obtained a position of equal importance ever had to fight its way into public favor with such persistent effort, through so many years." Few of the pioneers had the fortune to live, or the fortitude to persist, to enjoy the fruits of their enterprise; but it was not nature that disappointed them, nor was it capital; it was the great mass of their fellow citizens, who, we are told, have a natural right to coal.

And so history went on. Men continued to buy coal lands or to lease coal rights, to the enrichment of the farmers owning the land, and they continued to mine and send their product to the market. On the other hand, people contrived furnaces for their houses, anthracite-burning ranges for their kitchens, anthracite grates for their steam boilers, and communities grew up with the habit of burning anthracite coal. But there was no bargain between the consumers of the coal, the owners of the coal lands, and the miners and carriers of coal. The people who based their habits on the use of anthracite merely speculated on the probability that those who mined the coal and carried it to the market would find it profitable to do so.

These things being so, it is not easy to understand why any man, or any set of men, has any natural right to compel any other man, or set of men, to produce and ship anthracite coal. In fact, it is not a necessity of civilized life. Much the greatest part of mankind gets along without anthracite coal, and on our own continent we have immense cities where the fuel of common use is soft coal. Anthracite is a luxury.

It might be expedient for a State or nation, through its government, to take possession of the coal mines and work them, or to compel the owners and the miners to work them, under penalty of confiscation or fine and imprisonment. That might be expedient, but it would be gross tyranny.

During the Civil War a Major-General of the Union army was arrested and imprisoned in Fort Lafayette, in New York harbor. He was kept there for some months and then released and restored to duty. No court martial, or court of inquiry, was ever held on his case, although for the rest of his life he tried incessantly to have a court convened which might clear his name of the disgrace of that arrest and imprisonment. He not only suffered grievously in reputation, but he lost his chances of promotion. We once heard General MacClellan say that he went to Secretary Stanton about this matter. The Secretary said that "the country demanded a sacrifice; So-and-so was handy, and he was sacrificed." And that was the only satisfaction that the poor general could ever get. It might have been for the interest of the nation that these things should have been done. It might have been better for the reputation of the Secretary and the general that no court of inquiry should have been held, but it was a terrible act of tyranny.

We do not now discuss the question whether or not the owners of the coal mines and the miners themselves should be compelled by superior force to mine coal and carry it to the market. Such compulsion would be gross tyranny, but perhaps some people would think it justified by expediency.

September Accidents.

We publish in another column of this issue a condensed record of the principal train accidents which occurred in the United States in the month of September. The record contains accounts of 34 collisions, 25 derailments, and 3 other accidents. Those which were most serious, or are of special interest by reason of their causes or attending circumstances occurred as follows:

*1st, Berry Ala.	19th, Witmer, Pa.
2d, Brownwood, Texas.	†25th, Malden, Ill.
13th, Struby, Colo.	26th, Livingston, Mont.
18th, Leesburg, Ohio.	

The first accident in this list is the first in importance, 22 passengers having been killed by it. We have no information as to the cause of the derailment. The remarkable feature of the case is the fact that all of the passengers who were killed were on the platforms or

steps of the cars. Riding on the outside is said to be an incurable habit of the colored people in that region, and, in this case, it was entirely unnecessary. Although there was a large number of persons on the train there were, as we are informed by an officer of the road, more seats than passengers. The collision at Struby, Colo., serves as a reminder that the block system, which is in force on the road where this collision occurred, does not prevent all kinds of collisions. Two of the most disastrous collisions in the list, those at Leesburg and Witmer, occurred nearly at the same time, and the news of both was given to the world in the afternoon papers of the same day. In four serious accidents this month bridges were destroyed (on the 4th, the 10th, the 29th and the 30th).

Passenger train No. 1, of the Mexican Central, was derailed at a washout near Bermejillo on the morning of Sept. 2, and the engineman and three passengers were killed.

The number of street car accidents reported in the United States in September was 21, in which four persons were killed and 96 were injured.

It will be remembered that in November, 1900, there was a collision near Offenbach, Germany, in consequence of which a passenger car was burned with a number of its occupants. The indistinguishable remains of several of them were buried in one grave in the Offenbach Cemetery, at which ministered clergymen of four different religions, as it was known that followers of each were among the victims, and the ashes of Protestant, Jew and Catholic were thoroughly mingled. Now, nearly two years after the accident, which sent a chill of horror throughout Germany, the Prussian Ministry of Public Work has erected a fine monument over this grave, and one of its officers made an address at the ceremonies held at its unveiling. It must have taken a good deal of courage to do this, even with the conviction that the railroad management had done its best. The incident suggests that great railroad accidents might be commemorated by a lofty shaft at the place where they occurred, to warn railroad men to do their duty—and cause passengers to reflect on the uncertainty of life. But we cannot imagine one of our railroad managers taking part in any such public ceremony as that in the Offenbach Cemetery. To avoid all living personages, imagine the corner stone of a monument to the memory of a disastrous collision laid by the late lamented James Fisk, Jr.

Sept. 1, 1901, the Belgian State Railroads introduced a new parcels freight tariff, by which parcels up to a weight of 60 kilograms (132 lbs.) are carried anywhere in the kingdom for the same price, whatever the distance. (Belgium is about one-third larger than Massachusetts.) Thus, a package weighing 11 lbs. or less is carried for 10 cents, 12 to 22 lbs. for 12 cents, 23 to 44 lbs. for 14 cents, 45 to 66 lbs. for 16 cents, 67 to 88 lbs. for 18 cents, 89 to 110 lbs. for 20 cents, and 111 to 132 lbs. for 22 cents. An enormous increase in package freight has resulted, shown especially in shipments of fish from Ostend, these being carried by night trains, which bring fish delivered at the seaside in the evening to any station in the kingdom by morning. The receiving offices of the railroads in many places have been unable to handle the business offered and it is purposed to let private shops, etc., receive packages for a small fee, which will then be collected by the railroad wagons.

NEW PUBLICATIONS.

National Railroad Master Blacksmiths' Association.—Report of Proceedings of the Tenth Annual Convention, August, 1902. A. L. Woodworth, Secretary, Lima, Ohio.

This is a pamphlet of 184 pages with engravings, folding insets and an index. It contains also a list of the officers, committees and members of the association. The pamphlet can be obtained of the Secretary, whose address is given above.

Moody's Manual of Corporation Securities. 1902. Octavo, pp. 2,240; index. New York: John Moody & Co.; London: Effingham Wilson. Cloth, $7.50; flexible leather, $10.

This new volume of Moody's Manual contains 2,240 pages. It covers the securities of steam railroads, electric railroads, gas and electric light companies, telephone and telegraph companies, banks and trust companies, industrial companies and mining and oil companies. It gives very briefly the most essential facts about these securities and the names and addresses of officers and directors of the companies. The book is convenient to consult and has come to be recognized as a standard work.

Railroad Y. M. C. A. Buildings.—The International Committee of Young Men's Christian Associations, 3 West 29th street, New York City, has issued a little pamphlet of 32 pages, entitled "Railroad Young Men's Christian Association Work and Buildings," in which are shown illustrations of 16 buildings of this character, including those at Albany, Argentine, New York City (2), Philadelphia, and a number of other places. Some interior views are included, and also drawings of the floor plans of the buildings at Argentine, Kan.; Du Bois, Pa.; Sarnia, Ont., and Texarkana, Texas. The Young Men's Christian Association now has "railroad departments" at 150 places, with a membership of 37,000. The railroad companies contribute over $180,000 yearly to this work. A list is given of these 150 "departments," and also a list giving the value of a large number of buildings, scattered throughout the country, which are not illustrated. Buildings are now in course of erection at Cleburne, Texas; Bellefontaine, Ohio; Moberly, Mo.; Detroit, Mich.; Peoria, Ill.; West Albany, N. Y., and Melrose Junction, New York City. The railroad secretary of the international committee is Mr. Clarence J. Hicks. The price of the pamphlet is 15 cents.

TRADE CATALOGUES.

The Chicago Pneumatic Tool Co. (Fisher Building, Chicago, and 95 Liberty street, New York) issues a new catalogue of 72 pages, devoted to a description of air compressors made at the Franklin (Pennsylvania) works. These are especially designed for working pneumatic tools and machinery, but they are suitable for most of the purposes to which air compressors are put. They are to be driven by steam, electricity, water power, gas, or oil engines. These air compressors are described in considerable detail, with ample illustrations.

Motor and Trailing Trucks.—The Baldwin Record of Recent Construction, No. 38, which has just been issued, is given up to description and pictures of electric motor and trailing trucks. An introductory chapter describes in some detail the development of the trucks built by the Baldwin Locomotive Works, and there are engravings and specifications of trucks for the Boston Elevated Railway, the Manhattan Elevated, the Mersey Railway Company, the Metropolitan of Chicago, the Rapid Transit Subway of New York City, the South Side Elevated of Chicago, and various surface electric roads.

Belt Conveyors.—The Robins Conveying Belt Company (Park Row Building, New York City,) send us a circular, just issued, designed to call attention to the use of belt conveyors for stacking tailings. There are short descriptions, with engravings from photographs, of installations at various mines. For this use, belt conveyors have a capacity that is not approached by any other conveying or elevating system. With steady delivery of material to the belt, a capacity of 1,200 tons an hour is reached, and even a larger capacity may be had.

The Pintsch System of Car and Buoy Lighting.—The Safety Car Heating & Lighting Company has issued a new pamphlet describing the Pintsch plants in this country. It is embellished with pictures of a great number of Pintsch gas plants scattered all over the United States, and there is a list of these works with their locations. This shows how accessible the gas supply is to most railroads.

Unit Costs of Work in Progress.*

Sanford E. Thompson, Assoc. M. Am. Soc. C. E. (by letter).—Too great stress cannot be laid upon the utter worthlessness of any system of cost-keeping records which does not describe in full the materials handled and the conditions under which the work is performed.

The writer calls to mind a large cost-sheet relating to an earth dam with a concrete core-wall and a masonry spillway, which was constructed under contract, for storage-basin purposes, by one of our large cities. The engineers for the city had kept carefully the cost of each division of the work, and the unit costs were calculated. The cost per cubic yard for hauling the earth was calculated very carefully, but no remarks were made upon the character of the material excavated or the length of the haul. The actual cost per cubic yard of the masonry was recorded, but no distinction was made between face work and rubble work. The same lack of data was found in all the other divisions of the sheet. The unit costs were, in other words, of no use whatever in estimating another job, unless the design and the conditions under which the work was to be constructed were practically identical.

This is cited merely as an illustration of the numerous cases where time is wasted in making up records, which, while mathematically exact, give no results that can be used for the basis of estimates upon new work which is different and yet contains similar features.

In the annual reports of almost all city engineers there are tables of costs of pipe laying, paving, and other municipal work, which would be of considerable value to the profession if such details as depth of cut, character of materials, length of haul, and laborer's rate of wages per day were given.

The experience of the writer has been that to obtain unit costs of real value, either in factory cost-keeping or in engineering construction, careful observations, covering short periods of time but taken very accurately, with all the attendant conditions described fully, are of far greater value for future estimates than figures which cover a long period of time but are not itemized carefully and for which the work is not described accurately. Considerable experience and practice are necessary, in taking either indoor or outdoor records of times of short duration, to select average conditions, and to make sure that all the auxiliary operations of the work are included, and that sufficient allowances are made for the unavoidable delays occurring throughout the day.

W. W. Cummings, M. Am. Soc. C. E. (by letter).—The subject of "Unit Costs of Work" is worthy of much thought. The writer heartily agrees with Mr. Whinery that the knowledge of such units, as the work progresses, often leads to discoveries of want of proper management, or lack of previous knowledge of the difficulties to be met, which results in prompt discipline in the one case or more economical methods in the other, and which, without such a system, would not have been appreciated until it was too late to remedy the evils.

In harmony with Mr. Churchill's observations, the writer has known of ordinary second-rate foremen who have been stimulated into producing results of a high order by the daily comparison of the costs of their work.

It seems as though the discussion of advisability and possibility might be extended into a synopsis of the methods of securing these units and the principles on which such methods are based.

In establishing a system of reports, as has been well said, the general outlines must depend on the character of the work in hand, but the underlying principles are the same in all cases. No one but a person who has struggled through the establishment of such a method can appreciate the amount of labor necessary to avoid the complication caused by too much detail, or the ambiguity of too little.

Simplicity is the first requisite, both on account of the uneducated men on whom the engineer must depend to secure the first entries, and for the purpose of making the clerical labor a minimum. A great mistake is to aim at such accuracy in obtaining the first entries that the notes become complicated and confused. As Mr. Crowell has said, extreme accuracy is not necessary, nor is it desirable. With a little coaching, the foreman will use his judgment in charging the odd fractions of labor and material so that the weekly average will be more nearly correct than if a large mass of detailed data were obtained.

One principle that is important is to have the divisions and sub-divisions of the reports on the same general plan, so that, in the gradual combination of the diversified reports, it is only necessary to add the similar items from the different parts of the work and for the different days, weeks, months, etc., until the work is completed.

Another principle is to combine the statistics by "daily" totals, and "to date" totals, "grand totals," etc., so that the sub-division of costs is obtained at once and can be read at a glance.

In devising a system to apply these principles the engineer takes the items from which he made his estimate, and has a daily report card from each sub-division or foreman. On these cards the labor and tools are classified, and there are seven columns headed: Number of Men, Previous Amounts, Hours, Rate, Daily, To Date, and Remarks.

Each foreman enters the hours of labor and the material for his section for the day. His section comprises, if possible, a certain condition of work. The time-keeper fills out the "Previous," "Daily" and "To Date" columns, and, under "Remarks," gives the qualifying conditions.

The cards are sent to the office, together with the engineer's reports of the "daily" and "to date" work done in the corresponding classes. The book-keeper enters the totals, from the foremen working under similar conditions, on a page ruled into sections of three columns each and having a particular class of work for the heading of each section. Each of the three columns is headed "Amount," "Rate" and "Total," respectively. On one side of the page is a column for dates and a wide column for sub-divided headings, while on the other side of the page is a wide column for remarks. This page is headed like the different foremen's cards, and can be used for daily, weekly, monthly or yearly reports by simply transcribing the totals.

The writer has used such a system for a number of years, and has been agreeably surprised at the ease with which the foremen take up the idea, and the small clerical force necessary to keep the records up to date. He recalls one time when 1,500 men were employed on a line extending over 12 miles, and the entire force consisted of three division engineers with one and two assistants each, three time-keepers, one paymaster and two book-keepers. At that time the daily records were complete for inspection by 12 o'clock the following day.

S. Whinery, M. Am. Soc. C. E. (by letter).—The discussion of this topic has been interesting and valuable, but not as full as the importance of the subject merits.

If some member of the Society, who has given the subject attention and has had considerable experience in devising and applying cost-keeping systems on engineering works, would favor the Society with a paper upon the subject, going into details and illustrations, he would render a substantial service to the profession.

*An informal discussion at the Annual Convention of the American Society of Civil Engineers, May 21, 1902. Published in the October *Proceedings*.

I recently traveled by the fast service to the West of England by the London & South Western. The engine was one of the new four-cylinder non-compound without the wheels coupled as far as Salisbury. With a load of 200 long tons the time of 100 minutes for the 83½ miles was exactly kept, though on the grade of 1 in 165 owing to rain and slipping the speed dropped to 35 m.p.h.; trouble was experienced at the start with slipping, the first 3¾ miles taking 8½ min. On the return trip from Plymouth the work was remarkable. The load was 125 tons. The distance from Plymouth to Exeter is 57¼ miles, with an ascent of many miles at 79.2 ft. to the mile; the time allowed is 76 min. We ran the distance in 72 min. 10 sec. with one dead slow costing 3 min., the speed being 50.5 m.p.h. The minimum speed up the heaviest grade was 32 m.p.h., and in most cases was over 36 m.p.h.

R. HOPE.

TECHNICAL.

Manufacturing and Business.

P. H. Wilhelm will represent the Kindl Car Truck Co. in the South, with headquarters at 425 Austell Building, Atlanta, Ga.

The Cal. Hirsch & Sons Iron & Rail Company, St. Louis, Mo., has removed its general offices from the former location on Clark avenue to the Wells Building, corner of Broadway and Olive street.

Barber trucks will be used under the tenders of the nine locomotives building by the American Locomotive Co. for the Duluth, Missabe & Northern; also under the tenders for 10 locomotives building by the Baldwin Locomotive Works for the Erie Ry.

The Robt. Aitchison Perforated Metal Co., Chicago, is largely adding to its plant for the purpose of meeting its increased business. It is replacing its steam plant of about 40 h.p. with a new boiler house addition, 60 x 20 ft., to house a 125-h.p. boiler and a 100-h.p. engine.

The J. G. Brill Co., of Philadelphia, who recently bought the plant of the American Car Co., in St. Louis, Mo., and re-incorporated it under the name of the American Car & Truck Co., has just taken over the Brownell Car Works, which will be included in the American Car & Truck Company.

The Locomotive & Machine Co., of Montreal, has been incorporated to build locomotives and stationary engines, bridges, steamships, etc. The incorporators are: M. J. Haney, Toronto; James T. Davis and Michael Connolly, Montreal; G. P. Brophy, Ottawa, and Roger Miller, Ingersoll. The capital stock is $1,000,000, and the site for the plant is Longue Pointe, Montreal.

A statement issued to the stockholders by Frederick H. Eaton, President of the American Car & Foundry Company, shows the net earnings for the quarter ended Aug. 31, 1902, as $1,804,121.80. This, less reserve for dividends on common and preferred stock, payable Nov. 1, leaves a surplus earning for the quarter of $1,129,121.80, and a total surplus Aug. 31 of $7,643,169.20.

The American Blower Company, of Detroit, Mich., has recently booked a number of large orders for heating apparatus, including plants for the Lackawanna Steel Co.'s roll shop at Buffalo, N. Y.; the Pittsburgh Valve Foundry Construction Co., Pittsburgh, Pa.; Fox Typewriter Co., Grand Rapids, Mich., and the National Malleable Castings Co. at Sharon, Pa., also the entire drying apparatus for the new starch factory of Piel Bros., Indianapolis, Ind.

Pettibone, Mulliken & Co., Chicago, have recently filed for record the certificate of increase of their capital stock from $100,000 to $2,750,000, of which amount $750,000 is to be 10 per cent. cumulative preferred, and the balance common stock. The company has lately acquired a site at West Division street and North Forty-sixth avenue, Chicago, on which to build a large plant to make railroad supplies. Work on the excavations has already begun, and it is hoped to have the plant ready for operation by May 1, 1903.

Recent important contracts awarded the air compressor department of the Chicago Pneumatic Tool Co., include five cross compound compressors of 600 ft. capacity each, for the Baltimore & Ohio Railroad; two compressors of 2,000 ft. capacity each for the Pressed Steel Car Company; 2,000-ft. compressor for the Kawasaki Dockyard, Japan; two 600-ft. compressors for the New York, Ontario & Western Railroad; and one 700-ft. compressor for the signal department of the New York Central & Hudson River Railroad.

W. H. Stocks, who has been Master Mechanic of the Chicago, Rock Island & Pacific Railroad for several years, has resigned from that company to accept an appointment as representative of the Gold Car Heating & Lighting Co., of New York, Chicago and London. Mr. Stocks has been associated with the mechanical departments of the Minneapolis & St. Louis R. R., Great Northern R. R. and Chicago, Rock Island & Pacific R. R. for 25 years, during which time he has held the position of foreman, general foreman and master mechanic of the roads mentioned.

J. W. Duntley, President of the Chicago Pneumatic Tool Company, sailed Tuesday, Nov. 4, for Europe. He expects to spend about four weeks on the Continent and states that it is his intention to establish, either in England or Scotland, a new plant for the manufacture of pneumatic tools. The design of this new plant will be practically the same as that of the factory now being operated by his company at Detroit, Mich., which, the company claims, is the finest equipped manufacturing establishment of its kind in the world. This move was made necessary by the great increase in the amount of business received by this company from England during the past few months.

N. A. Christensen, formerly Superintendent, and now Consulting Engineer for the Christensen Engineering Co., Milwaukee, Wis., announces that the manufacture of all of his air compressors, with the exception of that used for air-brakes, has come under his control, and all previous correspondence relating to such compressors not connected with air-brakes for electric cars, together with plans, specifications and patterns have become his property. The compressors which he furnishes will be made by the Christensen Engineering Co., under his designs, specifications and inspection, which will insure the same excellence in design, detail and workmanship which the products of the company previously possessed. There are now in use over 7,000 compressors of all sizes and capacities constructed under Mr. Christensen's patents. His engineering and sales offices are in the Herman Building, Milwaukee.

The Pittsburgh Filter Mfg. Co., Empire Building, Pittsburgh, Pa., reports that it has had an unusually busy year in making installations of water works filters and water softening plants. In addition to the largest water softening plant in the world (one of 2,500,000 gallons for the Tennessee Coal, Iron & Railway Co., at Birmingham, Ala.) the company has built the following: Colorado Fuel & Iron Co., Pueblo, Colo., 7,500 h.p.; Indianapolis Water Co., Indianapolis, Ind., 3,000 h.p.; Cleveland Furnace Co., Cleveland, Ohio, 6,000 h.p.; Morey-La Rue Laundry Co., Elizabeth, N. J., 1,500 h.p.; Laflin & Rand Powder Co., Pompton Lakes, N. J., 1,000 h.p.; Hidalgo Mining Co., Parral, Mexico, 500 h.p.; Delaware, Lackawanna & Western R. R. plants at Groveland and East Bethany, N. Y., each with a capacity of 300,000 gals. daily; Keokuk Cereal Co., Keokuk, Iowa, 600,000 gals.; Sharon Water Works Co., Sharon, Pa., 2,000,000 gals.; Waynesburg Water Co., Waynesburg, Pa., 1,000,000 gals.; Columbia Water Co., Columbia, Pa., 2,000,000 gals; Upper Sandusky Water Co., Upper Sandusky, Ohio, 1,000,000 gals., and United States Zinc Co., New York, 600,000 gals.

Iron and Steel.

The Chesapeake Iron Works of Baltimore has been incorporated with $15,000 to make nuts and bolts. Chas. L. Applegarth and John Burneburg are two of the incorporators.

The Bessemer Iron Ore Co., with a capital stock of $500,000, was incorporated in New Jersey Nov. 1, to make and deal in steel and iron, and engage in mining in all its branches.

The Philadelphia & Reading has let a contract to the Neafie & Levy Ship & Engine Building Company for a new steel ferry boat for use on the line between Philadelphia and Camden.

It is reported that an order for 20,000 tons of plate was recently placed in Chicago. In Pittsburgh recent orders from boatbuilders are said to have aggregated 25,000 to 30,000 tons.

Idora Steel & Iron Company has been incorporated in New Jersey with a capital stock of $200,000. Incorporators, James Reily, Muncie, Ind.; William Flaherty and F. P. Flaherty, New Orleans.

The Rankin, Pa., plant of the American Steel & Wire Co., is reported to have broken all records in the manufacture of wire rods, having in one day of 24 hours made an output of 601,000 lbs. of No. 5 wire.

It is said that Stewart & Menzies, of Glasgow, and Lloyd & Lloyd, of Birmingham, England, two of the largest steel tube firms in the United Kingdom, have consolidated, with a capital of $7,500,000.

The Cumberland Foundry & Machine Company has been incorporated in Maryland with a capital stock of $5,000 by George F. Gephart, Frank C. Fleckenstein, Robert Roe, Jr., Thomas E. Roe and Lloyd Lowndes, Jr.

A German despatch says that in consequence of the inability of the American rail makers to guarantee delivery of 20,000 tons of rails and other railroad material, the Russian Government has just placed an order for this amount of material with the Creusot Company.

Contracts have been placed with Belgian rail makers for 8,000 tons of 60-lb. and 56-lb. rails, to be used on industrial roads in California and in Georgia. It is also said that negotiations are under way with Belgian rail makers for 50,000 tons to be delivered at the rate of 5,000 tons a month, beginning with January.

According to reports, negotiations are under way for the consolidation of the Pittsburgh Coal Co. and the Monongahela River Consolidated Coal & Coke Co., with their combined authorized capitalization of $110,000,000 and assets of over $120,000,000. The coal output of these two companies is close to 30,000,000 tons a year.

A Boston despatch says that the total value of contracts awarded on new building and engineering enterprises throughout New England for the past week approximates $1,203,000, as against $1,789,000 for the corresponding week last year, making a total of $117,634,000 to date this year, as against $105,241,000 for the corresponding period last year.

Arrangements have been made whereby the Lackawanna Iron & Steel Co., Buffalo, will take possession of the large plant of the Lake Erie Engineering Co. in the same city, and will use it to make the tools needed in the steel works at Stony Point. Richard Hammond, heretofore President of the engineering works, will manage this branch of the steel company's business.

Iron and Steel Situation.

Undue significance is attached to the announcement that the Frick Company will not advance next year's price for coke above $3. Although this is in line with other conservative efforts of leading interests to prevent inflated prices, yet the probable influence on the outside market will not be great, as the bulk of output will go to the various plants of the United States Steel Corporation. Meanwhile sales are now being made at $16 in extreme cases, and the scarcity has closed more blast furnaces. The future course of the iron and steel industry will be largely influenced by this fuel shortage, much business being permanently lost to home producers, and prices in some departments already show the effect of disorganized conditions. Railroad needs have not diminished, numerous large orders constantly appearing, while the presssure for locomotives is causing large premiums to be offered. Structural shapes for bridge and ship building are next in point of urgent demand.—*Dun's Review.*

Demand for old rails is very heavy, according to reports from Philadelphia, but railroads are holding back waiting to see if they can get new rails. Old steel rails are quoted at $21.50 and old iron rails at $24 to $25. Imports of pig iron at Philadelphia last week amounted to 6,351 tons, of which 337 tons came from the Dominion Iron & Steel Company at Sydney and the balance from England. Pig iron imports at Baltimore last week were 7,083 tons. Rail mills are sold up to next August, and the American Bridge Company has just taken orders for over a million dollars worth of material to be delivered in February, 1904.

The New Warships.

After considering the majority report of the Naval Board on Construction, which recommended that in the new ships to be ordered power should predominate over speed, and the minority report of Rear Admiral Melville in favor of speed, the Navy Department has decided in favor of the majority report after being assured by Admiral Melville that while short in speed the majority plans would give a most formidable ship. Advertisements have therefore been sent out by the Navy Department asking for bids for the construction of two armored cruisers of the "Tennessee" class of about 14,500 tons displacement, bids to be opened Jan. 6, 1903. The board will now complete plans for two small gunboats, for which bids will soon be asked. For the next fiscal year the board recommends the construction of two battleships, two armored cruisers and two gunboats. (Oct. 31, p. 844.)

Disappearing Gun Carriages.

The Army Board on Ordnance and Fortifications, after further consideration, has decided that the Buffington-Crozier disappearing gun carriage should be used for mounting 6-inch guns as well as for those of larger caliber, and the decision has been formally approved by the Secretary of War. The appropriation available for the 6-inch guns would mount about 50 on disappearing carriages, but it is not probable that so many will be placed on carriages of that type. (Sept. 26, p. 746.)

Canadian Iron and Steel Bounties.

The production of iron and steel upon which bounty was claimed in Canada last year was 413,039 tons. The details of the claims made by the several companies making iron and steel were as follows:

	Tons.	Bounty.
Pig-iron.		
Canada Iron Furnace Co., Midland	31,165	$80,146
Canada Iron Furnace Co., Radnor forges.	6,712	18,302
Deseronto Iron Co.	11,396	22,531
Dominion Iron & Steel Co.	201,247	393,952
The Electric Reduction Co.	56,059	168,525
Hamilton Steel & Iron Co.	62,059	161,525
John McDougall & Co.	1,043	3,027
Nova Scotia Steel & Coal Co.	27,974	61,356
Total	341,654	$741,009
Puddled bars—		
Hamilton Steel & Iron Co.	6,984	$20,549
Steel ingots—		
Dominion Iron & Steel Co.	28,026	78,790
Hamilton Steel & Iron Co.	16,771	49,140
Nova Scotia Steel & Coal Co.	19,602	57,871
Total	64,401	$185,802

A Blackwell's Island Bridge Commission.

The Mayor of New York has announced that he had appointed a committee of three experts, consisting of Prof. William H. Burr, of Columbia College; Prof. Palmer C. Ricketts, of the Rensselaer Polytechnic Institute, and Henry W. Hodge, of Boller & Hodge, to examine the revised plans of Bridge Commissioner Lindenthal for the Blackwell's Island Bridge. The Mayor has instructed the committee to report on the beauty, capacity and cost of the plans and to make their report as soon as possible.

Oil Fuel on the Southern Pacific.

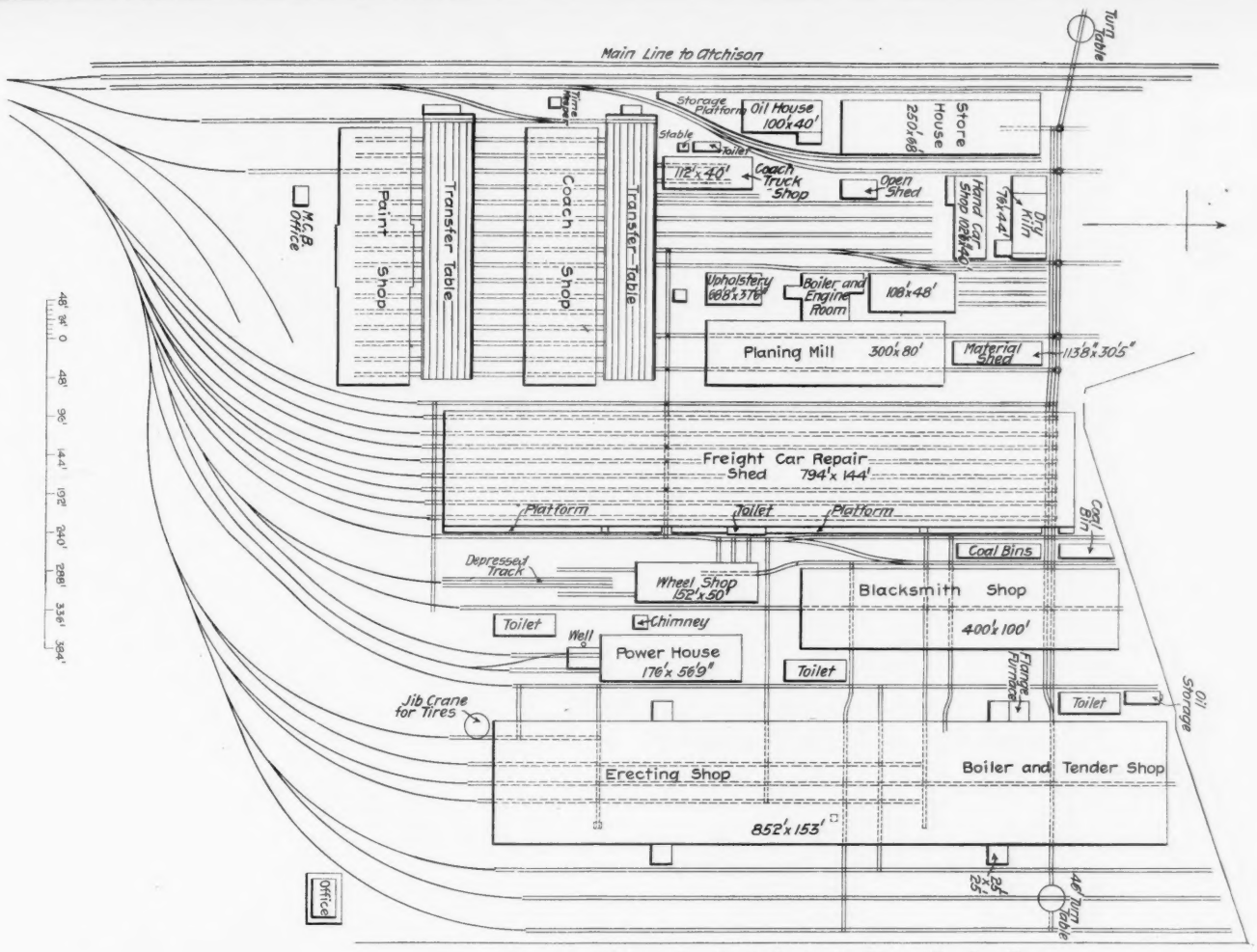
Recent newspaper paragraphs have said that the Southern Pacific Company will abandon the use of oil as fuel for locomotives and steamers, and is buying coal. We are told officially that such statements are entirely misleading. The company is building large storage tanks at fuel station points on its lines, and is pushing the application of oil burning apparatus on locomotives and steamers. Of coursse, the company buys some coal, as it has always done, as there are some sections of the road on which oil will not be used. Presumably the only reason that the company could have for giving up oil would be an increase in price beyond the point of economy as compared with coal. Such fluctuations have taken place in days past, but that was before the supply became anything like what can now be obtained from the Texas fields.

The Simplon Tunnel.

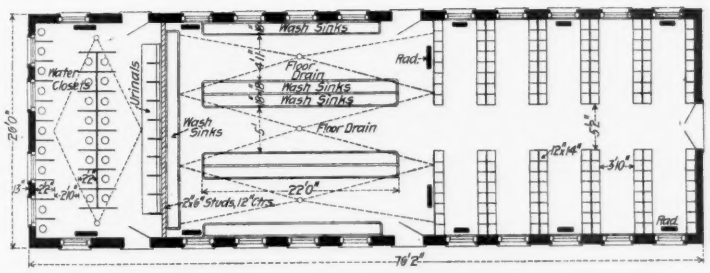
The Simplon Tunnel was extended 517 ft. at the north end and 565 ft. at the south end in the month of September, at the close of which the total penetration was nearly 8¼ miles. The flow of water at the south end continues at the rate of 88,000 gals. an hour, but it is insignificant at the north end.

A New Locomotive Works.

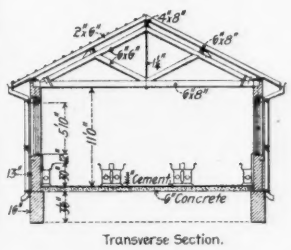
The Standard Motive Power Co. is now receiving bids for building a plant at Canal Dover, Ohio, in which to make and rebuild locomotives. The plant will consist of 15 brick and steel buildings, mostly one-story structures, varying in height and in length from 150 ft. to 500 ft. x 80 ft. to 110 ft. The preliminary work of grading and building sidings has already been begun and we are told



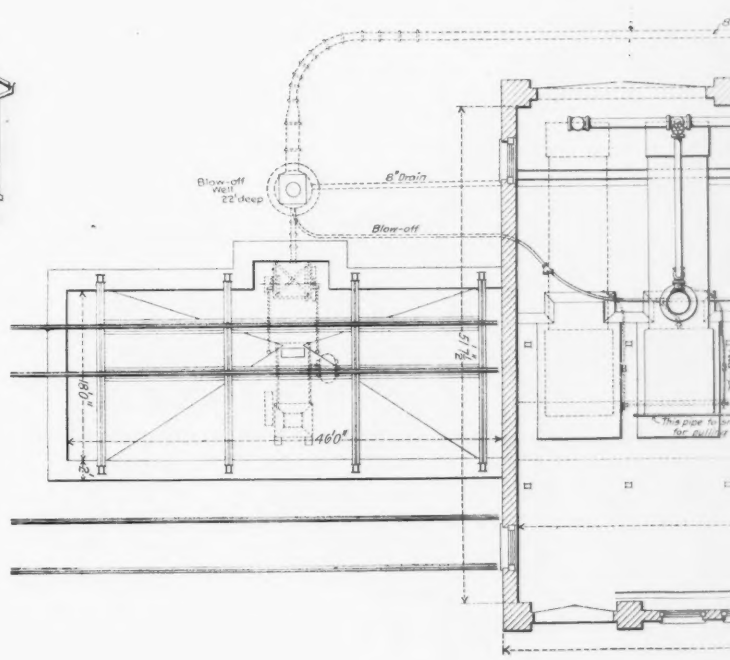
General Layout—Atchison, Topeka & Santa Fe Shops, Topeka, Kan.

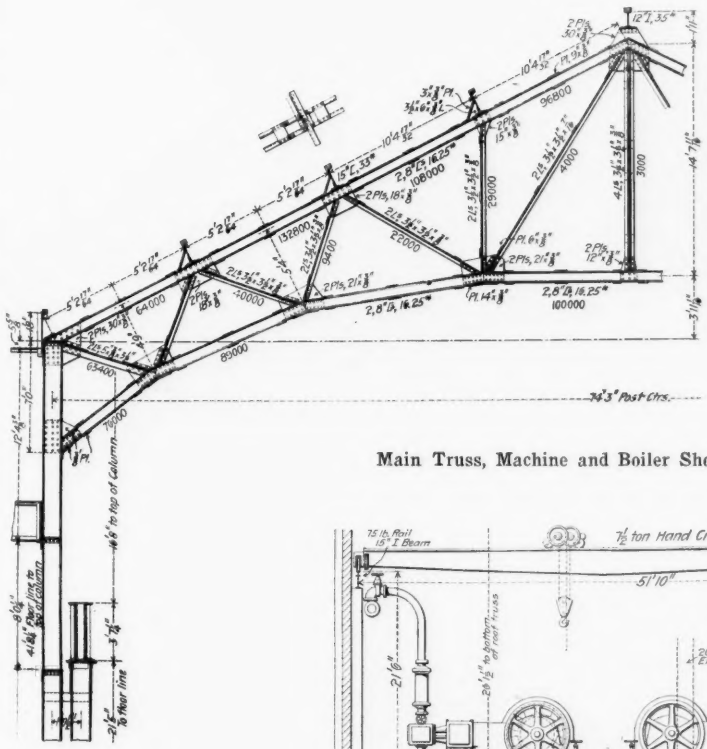


Lavatory Building.

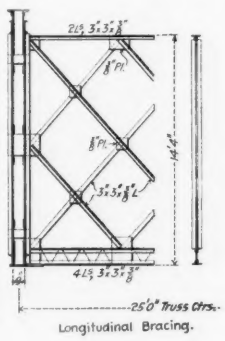


Transverse Section.

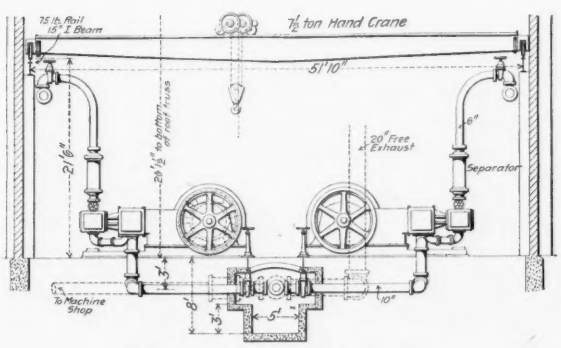




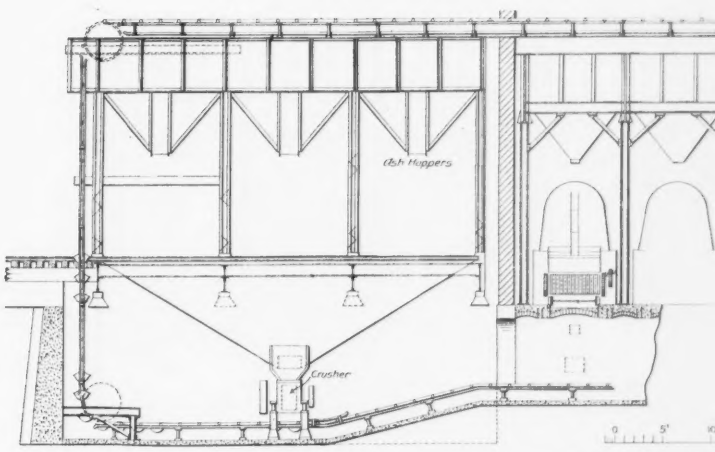
Main Truss, Machine and Boiler Shop.



Longitudinal Bracing.

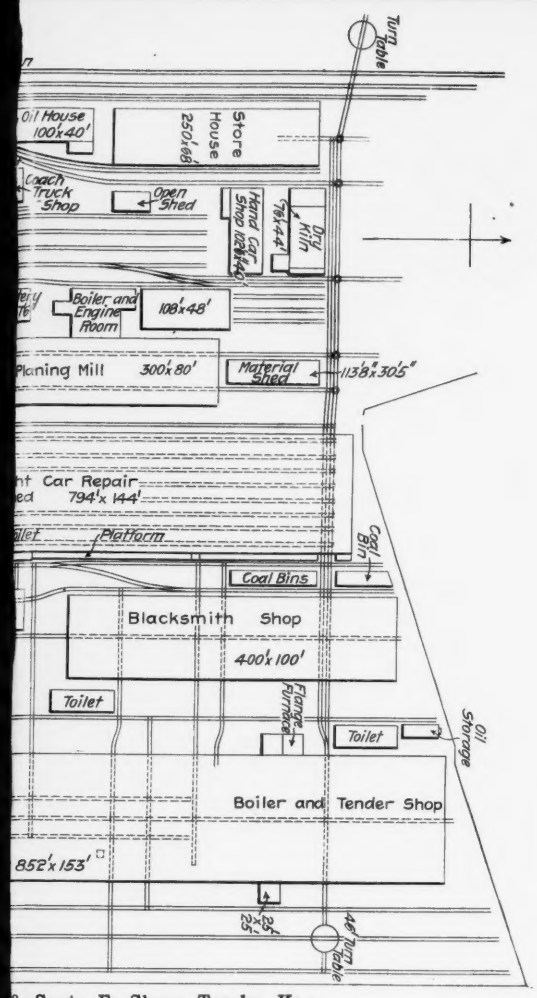


Transverse Section of Engine Room.

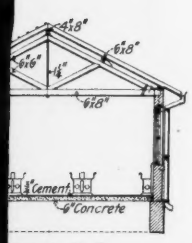


Section Showing

THE NEW SHOPS OF THE ATCHISON, TOPEKA & SANT



& Santa Fe Shops, Topeka, Kan.



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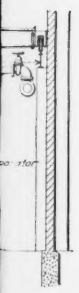

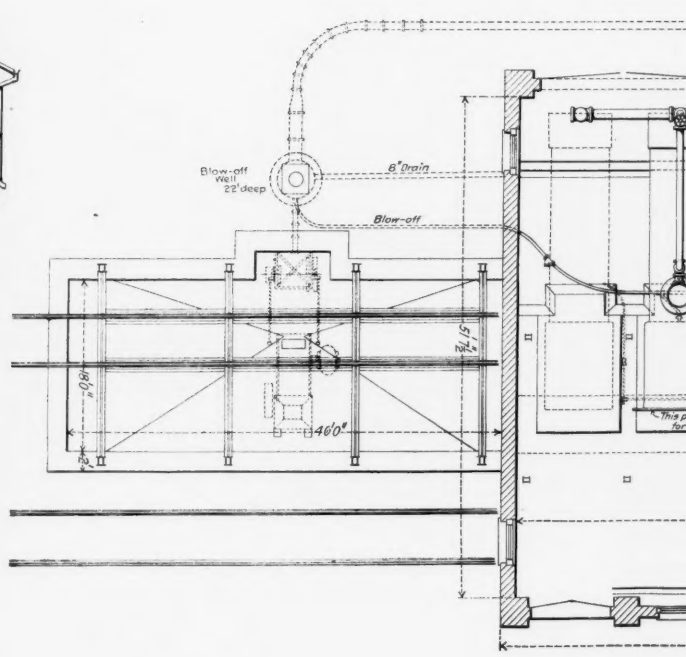

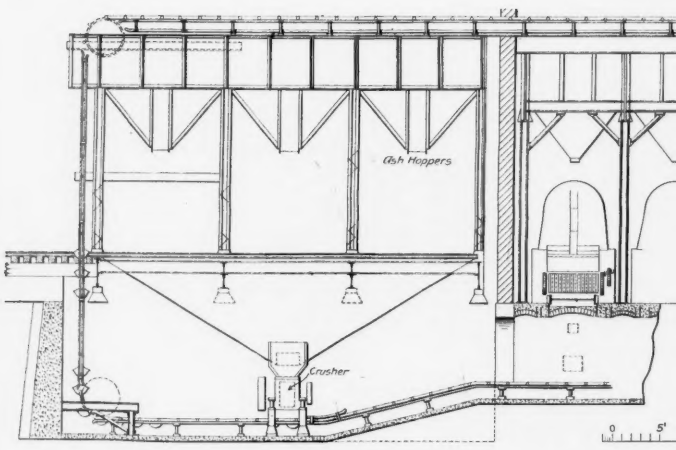

Section Show

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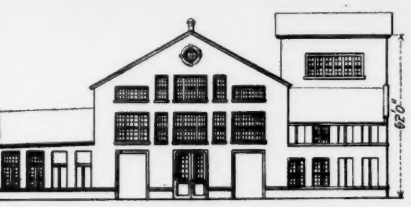
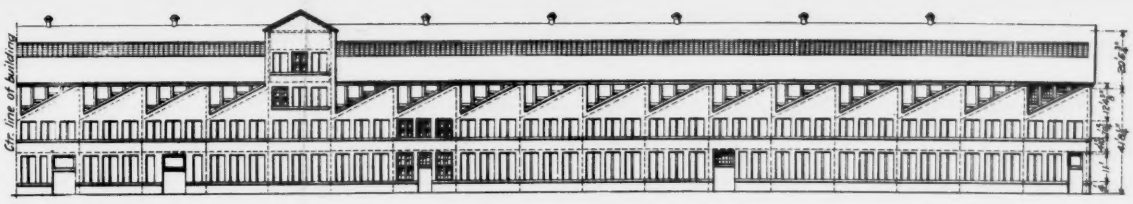
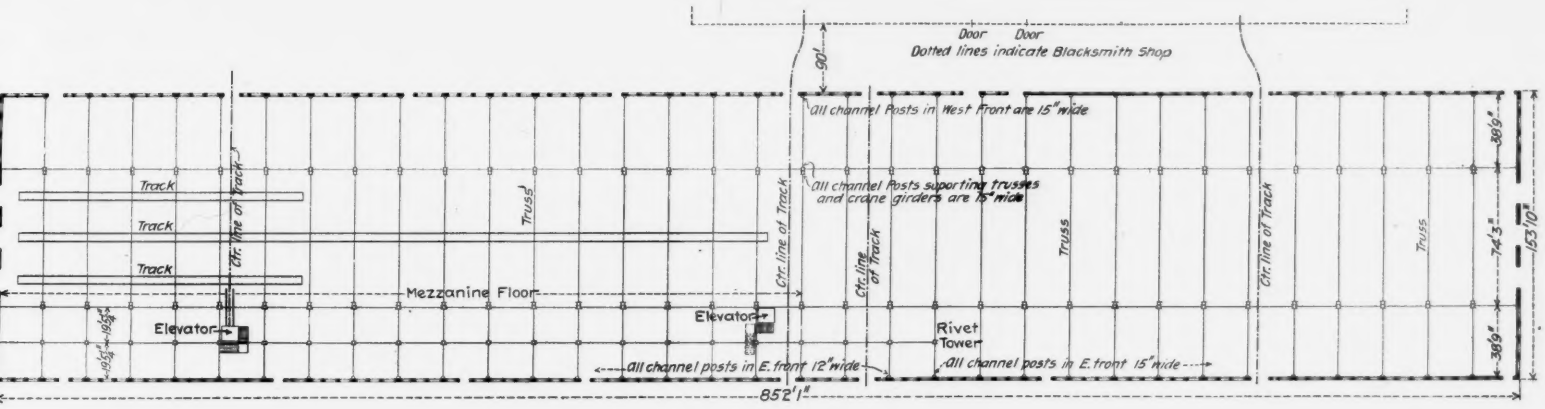


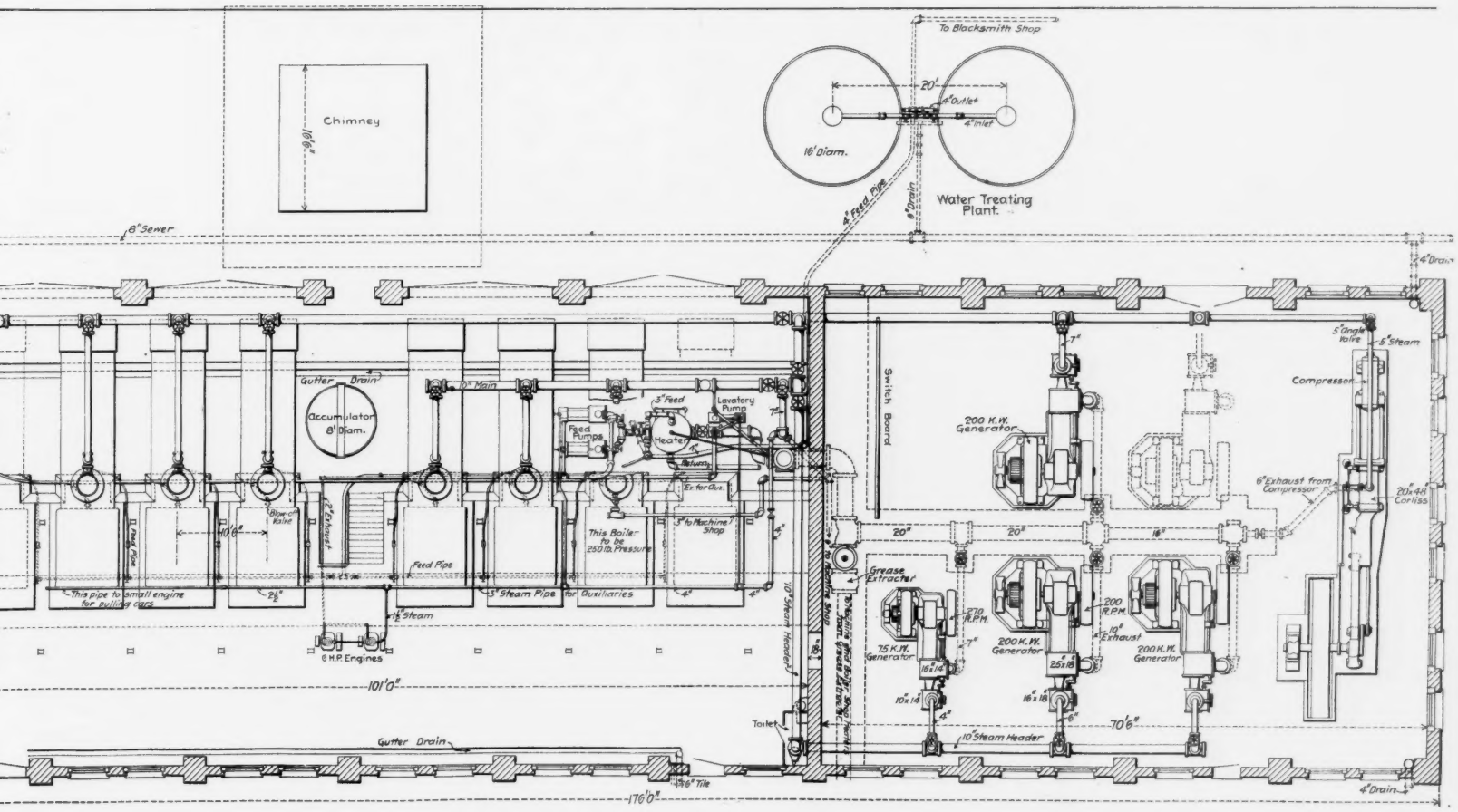
South Elevation.



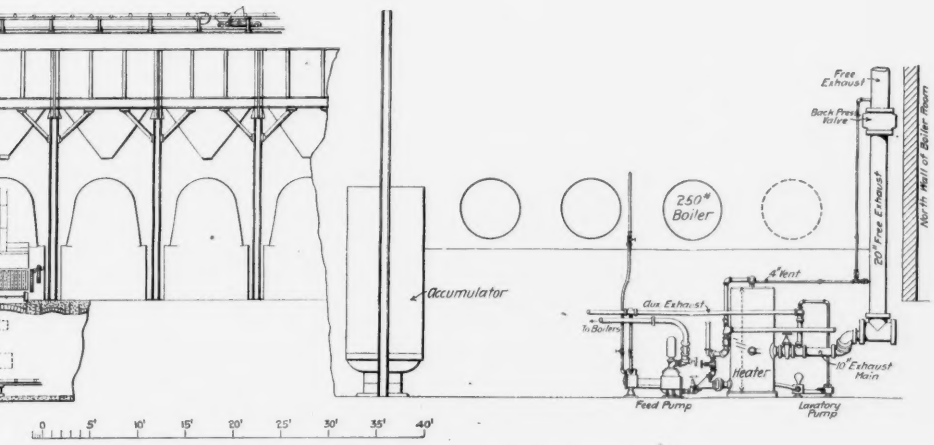
Half Elevation of East Front.



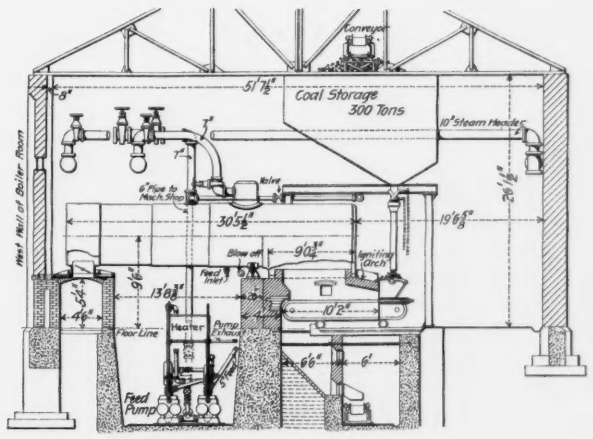
Locomotive Shop.



Plan of Power Station.



Section Showing Coal and Ash Handling Scheme.



Transverse Section of Boiler Room.

PEKA & SANTA FE RAILWAY, AT TOPEKA.

that the total work will cost about $1,000,000. A. P. Dodge is Superintendent.

The Camden Shops of the Pennsylvania.

Many improvements have recently been made at the Pavonia Car Shops of the Pennsylvania in Camden, N. J. The various departments have been enlarged and considerable new machinery has been put in. Electricity has been substituted for steam wherever practicable.

A Large Concrete Bridge.

One of the bridges to be built on the line of the San Pedro, Los Angeles & Salt Lake R. R. will be a concrete structure 900 ft. long, across Santa Ana River near Riverside, Cal. It will consist of eight spans of 100 ft. each, with 50 ft. of approaches on either end. The spans will be 86 ft. in the clear. The bridge will be 60 ft. above the bed of the river and the foundations will go down 14 ft. below the river bed. The contract has been let to the George Stone Company, of Oakland.

Draft Gear Tests.

The Master Car Builders' Association committee on draft gear has sent out the following circular:

At the last convention your Committee on Draft Gear presented the result of a series of drop, compression and tension tests of different draft gears, which tests were made at Altoona, Pa., and Purdue University, LaFayette, Ind. These tests, while they are valuable in showing the quality of materials in the draft gear and attachments, were not at all conclusive, and your committee recommended that a series of road tests should be conducted whereby a record could be kept for a given period of the repairs necessary to the draft gear itself and to the other parts of the car independent of each other; also that a record be kept of the car mileage and tons hauled during that period. This recommendation was concurred in by the convention, and your committee instructed accordingly. To carry out these tests it was thought best to confine them to cars not to exceed two years old on July 1, 1902, and thus include modern cars and practically the latest designs of draft gears.

The committee would therefore ask whether you will be willing to undertake keeping a record of the cost of repairs to draft gear in accordance with the form given below, so that when the results are asked for next spring the infomation will be available and uniform. [Form not reprinted.] It is suggested that the repairs referred to above should include both home and foreign repairs; that bills from foreign roads for repairs to these cars, if not sufficiently definite to furnish the information required, be returned with the request that the necessary data be supplied. Address reply to E. D. Bronner, Chairman, care of Michigan Central R. R., Detroit, Mich.

The Southern Car & Foundry Co. Sold.

The entire properties of the Southern Car & Foundry Company have been bought by a syndicate composed of J. A. Hansen, J. B. Brady, A. R. Fraser and others, some of whom are connected with the Standard Steel Car Company. A piece of property at Birmingham, Ala., has also been bought and a steel car plant will be built there. The Southern Car & Foundry Company controls plants and operates mills at Anniston, Ala.; Gadsden, Ala.; Lenoir City, Tenn., and Memphis, Tenn. The aggregate daily capacity of the four plants of the company is 50 cars, 120 axles, 100 tons of bar iron, 500 car wheels, 100 tons of gray castings and 20 tons of malleable castings. The company is now building a new car plant at Ensley, Ala., which will have a capacity of 20 steel cars and 25 freight cars. Its capital is $3,500,000, of which only $1,500,000 has been issued. At the close of business on March 31 last, when its yearly balance sheet was made up, it showed a surplus of $355,372.

Lancashire & Yorkshire Railway Electrification.

The directors of the Lancashire & Yorkshire Railway Company have decided to electrify their Liverpool & Southport Railway, which is about 18½ miles long, and which carries an enormous residential traffic. All the detail plans for this work have received careful consideration during the past twelve months, and various experiments, which have been tried at Horwich, have resulted in decisions upon important points of operating, thus enabling the work to be put in hand at once. It is anticipated that if the contractors can deliver early enough, the trains will be running in about nine months. If this is done, the Liverpool and Southport line will be the first main line railroad to be converted to the new system in England.

Pneumatic Tube Service.

The Postmaster General has signed contracts for the pneumatic tube service in Boston with the Boston Pneumatic Transit Company, and for the St. Louis service with the St. Louis Pneumatic Tube Company. It is expected that the Boston service will be in full operation early in November and the St. Louis service some time during the coming winter. The contract for the service in Chicago has been delayed pending an investigation of some legal questions concerning the bids. (Aug. 29, p. 677.)

Naval Ordnance.

Rear Admiral O'Neil, U. S. N., Chief of the Bureau of Ordnance, in his annual report asks for an appropriation of $13,182,806 for the next fiscal year, of which $10,000,000 is to be used for guns and armor for new ships. During the past year the gun factory at the Washington Navy Yard has been running on full time, the more important machines being run on double time with two shifts of men, and the average number of employees at the yard was 2,115. During the year 234 guns of various calibers have been completed, and many more are under way. A large number of gun mounts are being made; 275 have been completed. Since the making of modern guns at the Washington yard was begun in 1886, 1,210 guns have been completed there. The total value of finished work during the last year was $3,869,210, of which $1,858,750 was spent for labor and $2,010,460 for materials.

Report of the Chief of Engineers, U. S. A.

In his annual report Brigadier General Gillespie, Chief of Engineers U. S. Army, gives a list of 31 points at which projects for permanent seacoast defenses have been adopted, and says the defense of the Great Lakes and the St. Lawrence River is under consideration. Projects for defenses for Porto Rico, Hawaii, Guam, Manila and Subig Bay have been approved. The seacoast defenses in the United States are more than 50 per cent. completed, and 25 of the principal harbors have a sufficient number of guns and mortars mounted to make an effective defense against naval attack, while considerable progress has been made in installing adequate rapid-fire armament. Existing projects include 356 heavy guns, 1,294 rapid-fire guns and 544 mortars. The total cost for engineering work is estimated at $50,000,000, including completed work and work still to be done. During the past year eight 12-inch, three 8-inch, twenty rapid-fire guns and thirty-four mortars have been added, and permission is asked to resume the making of mortars. Among the larger improvements at Washington is the new filtration plant, work on the plans for which is being expedited as much as possible, Mr. Allen Hazen having been employed as consulting engineer to assist the army engineers in preparing plans. An appropriation of $1,468,405 is asked if this plant is to be completed in the fiscal year 1904. A detailed account of work on river and harbor improvements for the year is given, but as no river and harbor bill will be passed by Congress at its next session no estimates are given of amounts necessary to continue special improvement projects, but under continuing contracts $18,570,339 will be needed; for the California debris commission, $15,000; prevention of deposits in New York harbor, $120,000; enlargement of Governors Island, $400,000; for the Mississippi River Commission, $2,560,000, the appropriations to be made in the sundry civil appropriation bill. During the past year the expenditures aggregated $14,411,528.

THE SCRAP HEAP.

Notes.

According to the *News* of Tacoma, Washington, the Inter-urban Electric Railroad between that city and Seattle is putting in a telegraph line for use in sending train orders, because the use of the telephone for that service has proved unsatisfactory.

The Buffalo, Rochester & Pittsburgh has contracted with the National Telegraphone Company, of Rochester, N. Y., to have telephones put into a number of cabooses, baggage cars and locomotives for the purpose of facilitating prompt communication at all times between the superintendent's office and trains on the road.

Mr. Webb C. Ball, of Cleveland, Ohio, has been appointed Chief Watch Inspector of the New York Central & Hudson River Railroad, succeeding Mr. Frank Hammond, resigned. This puts all of the principal Vanderbilt lines under one uniform system of time service and watch inspection. Mr. Ball's headquarters will continue to be at Cleveland.

The enormous increase in freight traffic on the various divisions of the Pennsylvania and its controlled lines which center in Pittsburgh, has necessitated the employment of so many new enginemen that, according to a Pittsburgh paper, the usual time limit cannot be observed in the promotion of firemen. A large number of new firemen are being engaged.

The long-drawn-out strike of the conductors and motormen of the Hudson Valley (electric) railroad was finally settled on Nov. 2. Men who had received 16 cents an hour will receive 17 cents, and the 18½ cent rate is raised to 19 cents. All the former employees will have their old places, except those who are under indictment for law breaking. The railroad company does not recognize the employees' union. It is said that the men will form a new union, to be composed exclusively of employees of that road. The lawlessness connected with this strike was very annoying and persistent, although the total number of strikers was small. The State Militia had to be kept on duty at various points for several weeks.

The Pennsylvania Railroad Company in New York.

It is believed that the franchise of the Pennsylvania, New York & Long Island Company (the corporation which is to build and work the tunnel railroad) will go before the Aldermen of New York City next week. President Cassatt is reported to have said recently, what has been said before a good many times by the officers of the Pennsylvania, that these tunnels are designed for passenger, mail and express business only. The freight business can be done in the future, as it is done now, more cheaply by water than by rail; that is, the freight can be distributed all along the water fronts of both rivers as is now done. Mr. Cassatt further said:

"We interchange New England business with the New York, New Haven & Hartford by car floats plying between Jersey City and the Harlem River. Our plan now contemplates a ferry between Greenville, where we are establishing large freight yards and transfer bridges, and Bay Ridge. Between Bay Ridge and the East River, at Hell Gate, the Long Island tracks will be used, and it is proposed to erect a bridge across the river at Ward's Island, which will complete the connection. We are elevating tracks through Newark, New Brunswick, Trenton, Chester and Wilmington, and we propose to go on at once and elevate them through Rahway and Bristol, and at the same time improve the alignment.

"When this is done we expect to make the run between Philadelphia and the New York terminal in an hour and a half; between Baltimore and New York in three and one-quarter hours, and between Washington and New York in four hours."

River and Harbor Improvements.

The annual report of General G. L. Gillespie, Chief of Engineers of the United States army, for the year 1902, was made public Oct. 31. The report contains a complete resume of river and harbor improvements for the year, but owing to the fact that no river and harbor bill will be passed by Congress at its next session no estimates are made for special improvement projects. There is, however, an estimate in the lump for money required as follows: Under continuing contracts, $18,570,339; under California Debris Commission, $15,000; prevention of deposits in New York harbor, $120,260; enlargement of Governor's Island, New York harbor, $400,000. The Mississippi River Commission submits an estimate amounting to $2,560,000. During the past year the expenditures amounted in the aggregate to $14,411,528.

Standard Code on the C. G. W.

On Sept. 15 a code of rules was put into effect on the Chicago Great Western which contains the least variation from the Standard Code of anything we have seen. It contains rules for both single and double track, the double track rules and forms for train orders being prefixed by the letter "D" and printed in heavy type. They appear immediately after the single track rule of the corresponding number, which is according to recommendation.

The only point in which the rules differ materially from the Standard is the form and use of the clearance card. This is used to accompany the delivery of all train orders and shows the numbers of orders delivered to the train. As the "19" form is used, this form of clearance is of some value, as it constitutes a receipt for such orders, the operator keeping a copy of the clearance. This form of clearance is being adopted by many leading lines. There is also another form of clearance card which is issued to the engineman before leaving a terminal station stating that all trains which affect his rights have arrived and departed, which relieves him from checking the register.

The train order signal is normally clear. Color signals are red for "stop," white for "proceed" and green for "caution," except that train order signals show green for "clear."

Standard rule 4B governs a change of time-table, trains of the old time-table assuming the schedule of corresponding numbers on the new.

There is a provision on the time-table which is, we think, peculiar. The initial station for each train, instead of being determined by the district terminal, is indicated by a foot-note, and is the station where the schedule of that train originates on the division. If it runs over two or more districts, the initial point remains the same and the date of the train is established by such originating point. In other words, there is but one initial point for a train on any division, regardless of the number of districts over which it may run.—*Locomotive Firemen's Magazine.*

New Railroad in Spain.

Work was begun, with ceremonies, on the line which is to connect Vasco, Castellano, Madrid, Burgos, Bilbao and Biarritz on Oct. 20. The new railroad is designed to develop the iron and coal mines in the vicinity of Bilboa, and the promoters, engineers and capital are all said to be English.

Estimates for the District of Columbia.

The Commissioners of the District of Columbia in their estimates for the fiscal year beginning July 1, 1903, ask for a total appropriation of $10,875,652, or about $1,250,000 more than the appropriation for the current year which Congress reduced below the amount asked for. The Commissioners ask that the projects for a new filtration plant, new sewage disposal system, the municipal hospital, Connecticut Avenue Bridge, new railroad terminals and municipal building be considered as belonging to a separate account for extraordinary improvements to be met by advances from the Treasury and to be repaid with interest. If this is done the revenues of the District of Columbia will be sufficient to meet its ordinary expenditures, for which detailed estimates are submitted.

The Way to Treat Your Engineers.

A bronze bust of Ernest Dircksen, the engineer who built the Berlin Elevated Railroad, has been set up at the most important station on the line, and a street which for a long distance runs along the railroad (which is chiefly a masonry structure) has been named "Dircksen street." A distinguished party was present at the unveiling of the bust. Dircksen died about two years ago.

Speed on the Northern of France.

In our issue of Oct. 10, 1902, page 769, appeared a description of the recent de-Glehn du Bousquet compound locomotives of the Northern of France. We said then that on the level the speed frequently reaches 80 miles an hour. It is well known that the maximum speed in France is fixed by law at 75 miles an hour, and it might appear from our figures that the legal limit is disregarded. Of that we express no opinion.

LOCOMOTIVE BUILDING.

The Western Maryland is having six locomotives built at the Baldwin Works.

The Maine Central is having three locomotives built at the Schenectady works of the American Locomotive Co.

The Minneapolis, St. Paul & Sault Ste. Marie has ordered 20 locomotives from the American Locomotive Co.

The Lake Erie, Alliance & Wheeling has ordered four locomotives from the Brooks Works of the American Locomotive Co.

The Atlantic Coast Line is having 10 engines built at the Baldwin Works, in addition to the order reported in our issue of Oct. 3.

The Louisville, Henderson & St. Louis has ordered from F. M. Hicks one 55-ton freight engine rebuilt by the Hicks Locomotive & Car Works.

The Atlanta & West Point is having four locomotives built at the Rogers Works, and one at the Manchester Works of the American Locomotive Co.

The Santa Fe Central has ordered from F. M. Hicks one 18 x 24 in. mogul locomotive, and two 19 x 24 in. moguls, to be rebuilt at the Hicks Locomotive & Car Works.

The Sydney & Louisburg (Sydney, N. S.,) is asking prices on two consolidation engines, cylinders 21 x 26 in.; 50 in. drivers; weight, 180,000 lbs., with Prairie type fire-box; sloping back tenders of 4,000 gal. water capacity and nine tons of coal; equipped with headlights and pilots at each end. Address C. E. Slayton, Glace Bay, C. B., Canada.

The Ann Arbor order for two locomotives, reported in our issue of Oct. 24, calls for two simple 10-wheel locomotives to be built by the Baldwin Locomotive Works, for November, 1903, delivery. These locomotives will weigh 142,000 lbs., with 118,000 lbs. on the drivers, and have 19 x 26 in. cylinders, 60 in. drivers; wagon-top boilers, with a working steam pressure of 180 lbs.; 274 tubes, 2 in. in diameter, 14 ft. 6 in. long; fire-box of Otis steel 108 in. long and 42½ in. wide; tank capacity, 6,000 gallons of water and 10 tons of coal. The special equipment includes: Westinghouse air-brakes, steel axles, Cook bell ringers, Franklin boiler lagging, Sterlingworth brake-beams, Tower couplers, Star headlights, Sellers injectors, U. S. piston and valve rod packings, Ashton safety valves, Leach sanding devices, Detroit sight-feed lubricators, Pittsburgh Steel & Spring Co.'s springs and Standard driving wheel tires.

CAR BUILDING.

The Interoceanic of Mexico is asking prices on 25 coal cars.

The Bulger-Block Coal Co. is asking prices on 20 hopper cars.

The Louisiana & Northwestern is asking prices on 25 box cars.

The Grand Trunk is building 20 passenger cars at its own shops.

The South Side Elevated (Chicago) is reported in the market for 30 cars.

The Mexican International, according to report, is having 50 freights built.

The Missouri, Kansas & Texas is reported in the market for new coaches.

The Lehigh Valley is having six freights built at the Standard Steel Car Works.

The Atchison, Topeka & Santa Fe is preparing to order a large number of cars.

The Chicago, Milwaukee & St. Paul has ordered 10 sleepers from the Pullman Co.

The Lake Street Elevated (Chicago) is reported preparing to purchase new cars.

The St. Clair Coal Co. has ordered 50 cars from the American Car & Foundry Co.

The American Car & Foundry Co. has miscellaneous orders for 40 cars of various types.

The Waters-Pearce Oil Co. has ordered 50 tank cars from the American Car & Foundry Co.

Chas. Platt has ordered 50 30,000-lbs. capacity dump cars from the American Car & Foundry Co.

The Lake Shore & Michigan Southern is having five coaches built at the Barney & Smith Works.

The Cleveland, Cincinnati, Chicago & St. Louis denies being in the market for new cars at present.

The Chicago, Milwaukee & St. Paul denies building 1,300 freight cars at its West Milwaukee shops.

The Chicago, Peoria & St. Louis is reported to have ordered 300 coal cars from the Mt. Vernon Car Co.

The Central of New Jersey order with Harlan & Hollingsworth, reported in our issue of Oct. 24, calls for 17 coaches.

The Charleston, Clendennin & Sutton has ordered 50 freights from the Huntington Works of the American Car & Foundry Co.

The Jonesboro, Lake City & Eastern has purchased from F. M. Hicks 50 flat cars rebuilt at the Hicks Locomotive & Car Works.

The St. Louis & San Francisco, as reported in our issue of Oct. 17, is in the market for new coaches. The number required is 25.

The Evansville & Terre Haute is reported to have ordered 350 gondolas of 80,000 lbs. capacity, from the American Car & Foundry Co.

The Canadian Pacific writes that the details of the order for 20 first-class engines for which the company is in the market, have not as yet been settled.

The Kirby Lumber Co. has ordered 180 logging cars from the American Car & Foundry Co. This includes the order for 100 reported in our issue of Oct. 13.

The Santa Fe Central has ordered from F. M. Hicks 25 box cars, 15 gondolas, four coaches and one private car, to be rebuilt at the Hicks Locomotive & Car Works.

The Chicago & North Western is reported to have ordered 50 coaches from the American Car & Foundry Co., in addition to 50 recently ordered from the Pullman Works.

The Philadelphia & Reading, in addition to the order reported in our issue of Oct. 17, has ordered 37 coaches and three combination cars from the American Car & Foundry Co.

The Hocking Valley is considering the purchase of 200 wooden flat cars of 60,000 lbs. capacity. The special equipment will include: Simplex bolsters, Simplex solid brake-beams, U. S. Bronze Co.'s brasses, Buckeye couplers, McCord journal boxes and Railway Steel Spring Co.'s springs.

The Chicago, Peoria & St. Louis is building 100 wooden coal cars of 80,000 lbs. capacity at its Jacksonville (Ill.) shops. These cars will measure 36 ft. long and 9 ft. wide. The special equipment includes: M. C. B. iron axles, Simplex bolsters, Damascus brake-beams, Streeter steel back brake-shoes, Westinghouse air-brakes, Atlantic Brass Co.'s brasses, Kelso couplers, Republic friction draft rigging, Republic dust guards, McCord journal boxes, Scott springs and Diamond trucks.

The Mobile & Ohio has ordered 10 first-class coaches, two express cars, one mail and baggage car and one second-class partition coach from the American Car & Foundry Co. The first-class coaches will be 65 ft. long over end sills, and 9 ft. 8 in. wide. The express cars and the mail and baggage car will be 70 ft. long over end sills and 9 ft. 8 in. wide. The second-class coach will be 65 ft. long and 9 ft. 8 in. wide. Special equipment for all four classes includes iron axles, wrought iron bolsters, National hollow brake-beams, Corning brake-shoes, Westinghouse brakes, M. C. B. lead-lined brasses for 5 x 9 in. journals, Janney couplers, Safety Car Heating & Lighting Co. heating system, Pintsch gas, Chas. Scott Co. springs, six-wheel trucks, and 36-in. Paige wheels with steel tires. The coaches will have Pullman wide vestibules. The other equipment will have Pullman short vestibules. The mail and baggage car will have the standard 30-ft. mail apartment, as approved by the U. S. Railroad Mail Service.

BRIDGE BUILDING.

Allegheny, Pa.—The City Recorder has approved an ordinance to permit the Pennsylvania Co. to elevate part of the tracks through Allegheny, eliminating several street crossings.

Asher, Okla. T.—A stock company is being formed here to build a steel toll bridge across the Canadian River. The preliminary soundings have been made and stock has been mostly subscribed.

Boston, Mass.—The Railroad Commission is considering the application of the Hartford & Worcester Street Ry. in the matter of closing streets and building bridges at some highway crossings.

Canon City, Colo.—Bids are wanted Nov. 10, for repairs and improvements on Ninth street bridge. L. X. Kohlman, County Clerk.

Chicago, Ill.—Bids are wanted Dec. 17 by the Sanitary District Trustees for the superstructure of a Hall type bascule bridge over the Chicago River at Harrison street. A. R. Porter, clerk. The Drainage Board has voted to issue $1,500,000 of bonds to build other bascule bridges.

Connellsville, Pa.—The bridge which is to be built over the Youghiogheny River between Connellsville and Greenwood will be built by the Greenwood Bridge Co., of which L. F. Ruth, of Connellsville, is President. The question of crossing the tracks of the Baltimore & Ohio R. R. will probably be decided within a short time, and then the detailed plans will be made by the Osborn Engineering Co., of Cleveland. The Baltimore & Ohio is not interested in this bridge, as reported, except that the structure will cross its tracks.

Fort Wayne, Ind.—The Fort Wayne, Van Wert & Lima Traction Co. is letting contracts for all bridges on its right of way. There will be 14 steel structures in all, and they are estimated to cost $150,000.

French Indo China.—Bids are wanted until Jan. 17, 1903, by the Directorate-General of Public Works at Hanoi for two bridges. Specifications, etc., of the Inspector-General of Public Works for the Colonies, Ministry of the Colonies, Paris. A provisional deposit of 7,500 francs ($1,447), and a final deposit of 15,000 francs ($2,895) is required to qualify any tender.

Kokomo, Ind.—Plans have been made for the new Main street bridge, by Ellsworth Hunt, County Surveyor.

Milwaukee, Wis.—The Council is considering the question of building a bridge across the Menomonee valley at 27th street.

New York City, N. Y.—The Mayor has signed an ordinance to provide for the issue of corporate stock to the amount of $2,920,000 to acquire title to land needed for the Manhattan and Brooklyn anchorages, and other work in connection with the Manhattan bridge, the Brooklyn pier of which is now being built. Another ordinance of a similar nature for $1,620,000 for building the island span of the Blackwell's Island bridge and the two adjacent cantilevers between Manhattan and Queens, also was approved by the Mayor. A Commission has been appointed to examine the revised plans of the Bridge Commissioner for this latter bridge.

Norwich, Conn.—The County Board is considering building a steel bridge over Yantic River and the Central Vermont R. R. tracks, near the Falls.

Oberlin, Kan.—Bids are wanted by J. E. Platts, County Clerk, Nov. 13, for a bridge over Sappa Creek.

Oswego, N. Y.—About $40,000 worth of repairs will be made to bridge over Oswego River between East and West Oswego.

Philadelphia, Pa.—Action will soon be taken on the ordinance for bridge over Allegheny avenue near Ninth street which will probably cost $60,000.

Pittsburgh, Pa.—The Pittsburgh & Lake Erie will begin at once the work of replacing open bridges with cement culverts and wooden structures with steel ones. Bids have been called for three cement culverts. They will be constructed at Becks run, Montour and Laschell. About $1,000,000 will be spent in this work.

Reading, Pa.—Plans have been made for the proposed bridge over the Schuylkill River from the foot of Sixth street. It will be 510 ft. long and divided into three spans, with 200 ft. of approaches on the Reading side, and about 1,000 ft. on the opposite side. It is said the cost will reach $75,000.

Richmond, Va.—Col. John Murphy will build two bridges connecting two parts of his hotel.

Sellersville, Pa.—The County Commissioners have ordered that bids be received Nov. 20 by the clerk for a bridge at Leatherman's Ford.

Tacoma, Wash.—The City Council has taken up the Puyallup River draw bridge question, and it seems probable that the structure will soon be ordered, at a cost not to exceed $10,000.

Toronto, Ont.—The City Engineer writes that the City Council has not yet decided to build a new bridge over Keating's Channel as recently reported.

Waco, Texas.—The question of a new bridge on 14th street and Cleveland avenue is being considered. The City Engineer has been asked to make estimates.

Washington, D. C.—The Secretary of War has returned to Col. Allen, Corps of Engineers U. S. Army, in charge of the work, the plans and specifications for the new highway bridge across the Potomac River, with instructions to so amend them that the superstructure of the bridge will be practically identical in form with the new Long bridge of the Pennsylvania Railroad. The Secretary of War says that as the railroad company was put to additional expense in changing its bridge from a plain Howe truss in order that the sky line should be straight and continuous, it is only fair that the Government bridge should meet the same conditions, and as the arched truss design planned for its superstructure cannot well be altered to meet such requirements new plans must be prepared in order that the bridge may correspond with the railroad bridge as to piers, spans and superstructure. (Oct. 31, p. 842.)

Youngstown, Ohio.—The County Commissioners are considering plans for the proposed bridge at Mill Creek which will cost $120,000.

Other Structures.

Atlanta, Ga.—It is said the Southern Ry. has begun preliminary work on building the new passenger station in Atlanta, the trainshed of which will cover an area of 630,000 sq. ft.

Beaumont, Texas.—The roundhouse and shops of the Atchison, Topeka & Santa Fe and several locomotives were destroyed by fire here on Oct. 30. The estimated loss is $75,000.

Canton, Ohio.—The Canton Steel Co., recently incorporated with $400,000 capital in Pennsylvania, will build its plant at Canton to make steel. Frank B. Smith, of Sewickley, Pa., is President; R. H. Bulley, Manager.

Chicago, Ill.—The Chicago & Western Indiana is said to be contemplating a new station at Polk and Dearborn streets.

Clarksville, Tenn.—The Chief Engineer of the Tennessee Central has been selecting sites for new stations.

Decatur, Ill.—The Decatur Bridge Co. has been organized by T. L. Blackman, Melville Wood, E. B. Taylor and Geo. Caldwell, all formerly connected with the Indiana Bridge Co., of Muncie, Ind. The main building of the new plant will be 70 x 200 ft.; the blacksmith shop 40 x 50 ft.; engine room and boiler room each 25 x 30 ft. It is said the contracts for the machinery have not yet been placed. Mr. Taylor can be addressed at Muncie, Ind.

Detroit, Mich.—The Great Lakes Engineering Co., affiliated with the Great Lakes Ship Building Co., will build a plant on a site recently bought along the River Rouge. This company is capitalized at $5,000,000, and J. D. Hawks and George H. Russell are interested. It will also build a steel plate mill as soon as the new blast furnaces now building at Delray are in operation.

Dover, N. J.—Bids are wanted at the U. S. Powder Depot until Nov. 28 for building four one-story brick and steel buildings, as follows: Magazine for high explosives, 50 x 150 ft.; storehouse for fused projectiles, 50 x 200 ft.; house for fusing high explosive shells, 30 x 75 ft.; detonating fuse house, 30 x 42 ft. Bids will be received for all or part of foregoing. Information can be had on application to Capt. O. B. Mitcham, Ord. Dept. Comdg.

Eddystone, Pa.—A large car building plant will be established here, plans for which are being made by David Townsend, of Philadelphia. There will be a one-story main building, 300 x 57 ft., a one-story boiler house, 50 x 145 ft., and a three-story office building 50 x 100 ft., all of brick.

Franklin, Pa.—A plant is being built here for the Franklin Rolling Mill & Foundry Co. The main building will be 100 x 300 ft., of steel construction, and the foundry will be 100 x 275 ft., of frame construction on account of the difficulty of obtaining steel. It is expected to have the rolling mill in operation by the middle of next March. Chas. Mackey is President, and J. W. Rowland, Vice-President.

Great Falls, Mont.—James J. Hill has announced that he will develop the steel and iron industries in the Northwest. He has bought the old silver smelting works of the American Smelting & Refining Co. at Great Falls, Mont., and will change them into an iron and steel mill. Reports state that the plans for contemplated buildings are already made.

Johnstown, Pa.—The Lorain Steel Co. is making plans for another large building to be used as a switch department. The contract has been let to the Pittsburgh Steel Construction Co. There are several buildings under construction; one to be used as a bending department will be 325 ft. x 75 ft. The machine shop will be the same size, and the fitting department will be 87 x 325 ft. All these buildings will be equipped with modern electrically driven tools. Considerable of the machinery for the switch department has not yet been contracted for.

Londonderry, N. S.—The Londonderry Iron & Mining Co., formerly the Londonderry Iron Co., whose works were destroyed by fire, are getting ready to build a new plant, but, according to report, has not yet definitely decided where it will be built. It is said that the new furnaces will have an annual capacity of 40,000 tons. An iron foundry and pipe mills are to be built. The incorporators of the new company are: Geo. E. Drummond, F. C. Henshaw, T. J. Drummond, Ted. McCall, Edgar MacDougall, Montreal, and Charles Wilson Brega, Chicago.

McKeesport, Pa.—The Pittsburgh & Lake Erie is getting bids on a storehouse here.

Manchester, Va.—It is said that the Southern Ry. is considering establishing a car wheel plant at Manchester in the near future.

Martinsburg, W. Va.—The preliminary work on building the new car repair shops at this place, on the Baltimore & Ohio, is under way.

Milwaukee, Wis.—The Crucible Steel Co. has been buying land at this place on which, it is said, a large plant will be built.

New Castle, Pa.—Several blast furnaces are to be built at New Castle by the Iselin coal and iron interests, and it is said that the Buffalo, Rochester & Pittsburgh will be extended from Butler to New Castle to assist in this work. Arthur G. Yates, President of the railroad interests, and Lucius W. Robinson, President of the Rochester & Pittsburgh Coal & Iron Co., were recently in New Castle inspecting sites.

Oelwein, Iowa.—The practically new shops of the Chicago Great Western at Oelwein, Iowa, are to be considerably increased in capacity by some additions to existing buildings and the erection of a coach shop. The main shop is to have a 150-ft. addition and the blacksmith and paint shops will also be added to. The power plant

and electrical equipment are to be nearly doubled, the additions to the power equipment comprising a new 400 k.w. direct-connected unit, 300-h.p. water-tube boiler and a mechanical draft fan. The contract for the power plant and electrical equipment has been awarded to the Arnold Electric Power Station Co., Chicago, who installed the original plant.

PITTSBURGH, PA.—The Monongahela Iron & Steel Co., which has a modern puddling and crucible steel plant at Hays Station, near West Homestead, is having plans made for a blast furnace at that place. It is said the new furnace will have a daily capacity of 250 tons.

SHERMAN, TEXAS.—Mr. Markham, Vice-President of the Houston & Texas Central, is reported as saying that his company is ready to join with the other roads in building a union station in Sherman.

SIOUX CITY, IOWA.—It is said the Chicago, Milwaukee & St. Paul has plans made for a new passenger station at the foot of Douglas street.

SOMERVILLE, TENN.—Fire has destroyed the warehouse of the Nashville, Chattanooga & St. Louis Ry. Loss, $55,000.

TOPEKA, KAN.—The Elizabeth Steel Bridge Works, of Elizabeth, Ill., as reported in these columns some time ago as considering locating farther west, has decided to build at Topeka. It has already placed orders for material for its new shops, which, it is said, will be operated by electricity and will be equipped throughout with pneumatic labor saving machinery.

TORONTO, ONT.—The Grand Trunk, according to report, has practically decided upon plans for its new freight depot on the old Parliament Buildings site. The site of the old freight sheds will be used for a passenger terminal.

WATERBURY, CONN.—The Manufacturers' Foundry Co., now located on Benedict street, has increased its capital stock from $10,000 to $50,000, and the company is having plans made for a new factory 80 x 260 ft., on a new site.

MEETINGS AND ANNOUNCEMENTS.

(For dates of conventions and regular meetings of railroad associations and engineering societies see advertising page xvi.)

Canadian Society of Civil Engineers.

At the meeting on Thursday, Nov. 6, a paper was read by A. W. Robinson on "The Economy of Large Ships."

American Society of Civil Engineers.

On Wednesday, Nov. 5, at 8:30 p.m., a regular business meeting of the Society was held, and Isaac Harby, Jun. Am. Soc. C. E., presented for discussion a paper entitled "The Footbridge for Building the Cables of the New East River Bridge." It was illustrated with lantern-slides. This paper was printed in the "Proceedings" for September, 1902.

The Car Foremen's Association of Chicago.

The regular meeting of this Association will be held in Room 209, Masonic Temple, Wednesday, Nov. 12, at 8 p.m. Following is the programme:

1. Continuation of the discussion of the new M. C. B. rules, begun at the last meeting.
2. What is a reasonable length of time in which to make an inspection of a car at an interchange point; also in making an inspection for safety.
3. Defective railroad crossings and the injury they cause to car equipment.

Central Railway Club.

The next regular meeting of the club will be held at the Hotel Iroquois, Buffalo, N. Y., on Friday, Nov. 14, 1902, at 2 p.m., the Executive Committee meeting at the same place at 1 p.m. Mr. L. R. Pomeroy, of New York, special representative of the railway department of the General Electric Company, has accepted an invitation to present a report on "The Advantages of Electrically Driven Railroad Shops," and which will be illustrated with comprehensive diagrams. No advance copy of this paper will be sent out.

The Railway Club of Pittsburgh.

The first annual meeting of the Railway Club of Pittsburgh was held Friday night, Oct. 24. The formal speeches were by Colonel J. M. Schoonmaker, Vice-President and General Manager of the Pittsburgh & Lake Erie, and Mr. George A. Post, of the Standard Coupler Co. It was estimated that there were about 400 people present. The membership of the club is now 311. The officers were re-elected as follows: President, J. H. McConnell, of the Pittsburgh Works, American Locomotive Co.; Vice-President, L. H. Turner, Superintendent of Motive Power Pittsburgh & Lake Erie R. R.; Secretary, J. D. Conway, Chief Clerk Motive Power Department Pittsburgh & Lake Erie; Treasurer, J. D. McIlwain, of J. D. McIlwain & Co. The executive committee is composed of Messrs. D. F. Crawford, J. E. Simons and F. T. Hyndman.

The Traveling Engineers' Association.

Following are the subjects for discussion, to be presented at the next annual convention of the Traveling Engineers' Association, and the chairmen of the committees:

No. 1. Traveling Engineers front and arrangement, adaptable to modern power. F. McArdle, B. C. R. & N. R. R., chairman.

No. 2. Most satisfactory method of lubricating piston rod and valve stem packing, also cylinders of engines equipped with piston valves. E. W. Brown, D., L. & W. R. R., chairman.

No. 3. Taken from an economical standpoint, how do you consider the use of brick arches in engines burning bituminous coal, deep, shallow and wide fire-boxes? W. G. Wallace, C. & N. W. R. R., chairman.

No. 4. Is there an advantage in placing main check valves above the water line of boilers when feed water contains lime and when scale forms on injectors, injector tubes, etc.? What is the best method of removing same? F. T. Bowles, L. E. & W. R. R., chairman.

The following papers will be presented:

No. 1. Is the water glass a valuable adjunct to successful operation of the locomotive? By Clinton B. Conger.

No. 2. What practice should Traveling Engineers pursue in riding on engines, and instructing, to obtain best results? C. H. Hogan.

No. 3. Is it desirable that freight and switch engines be equipped with the combined straight and automatic brake on engine and tender? What are the advantages and disadvantages of having an engine so equipped? W. H. Green.

No. 4. The proper care and handling of compound engines. By A. L. Beardsley.

Change of Constitution and By-Laws. Malon Laquay, chairman. Subjects for discussion for 1904. John Donovan, chairman.

Committee of arrangements for next annual convention. A. M. Bickel, chairman.

PERSONAL.

—Mr. James A. Logan, General Solicitor of the Pennsylvania Railroad, died recently.

—Mr. Samuel H. Edgar, Second Vice-President of the Louisville & Nashville Railroad, died Nov. 1. Mr. Edgar was born in Philadelphia in 1845 and during his early years was engaged in the hardware business in Wilmington, Del. For several years he was with the Louisville & Nashville as Assistant Treasurer, later becoming Second Vice-President. He began his railroad service in 1868, and from then until going with the Louisville & Nashville, was connected with various roads in different capacities.

—Mr. M. R. Coutant is the new Master Mechanic of the Erie Railroad at Susquehanna, Pa. When a boy Mr. Coutant spent his vacations in the shops of the Ohio & Mississippi as a sort of special apprentice and later entered the shops of the Indianapolis & St. Louis. For one year he was with the Union Pacific as division draftsman. Mr. Coutant then came east as draftsman for the Universal Car Truck Company, of Chicago, but left there shortly to go with the Wabash. From this company he went to the Louisville & Nashville as chief draftsman, later taking a similar position with the Santa Fe. Mr. Coutant again returned to the Wabash as Acting Master Mechanic of the Eastern Division, where he remained up to the time of his new appointment on the Erie.

—Mr. H. E. Passmore, the new Superintendent of Motive Power & Equipment of the Detroit Southern, succeeding Mr. Roberts, was born in 1866. At the age of 18 his railroad service began, starting with the Pennsylvania Railroad. In 1888 he went to Altoona as a machinist and two years afterwards went with the Norfolk & Western, where he remained for four years as a machinist. In 1894 he resigned from this company to go with the Baldwin Locomotive Works as traveling engineer. In 1896 Mr. Passmore returned to railroading as a General Foreman on the Philadelphia & Reading, and in 1898 he went to the Western Maryland as Assistant Master of Machinery at Hagerstown. Mr. Passmore assumed his new duties on Oct. 12.

—Mr. Byron H. Bryant, who has just become Chief Engineer of the Colorado Midland, was born near Woonsocket Falls, R. I., in 1847. His railroad service dates from 1867, when he became a rodman on the Grand Rapids & Indiana. Then for one year (1871-1872) he was Chief Engineer of the Grand Rapids & Holland, later becoming locating and Division Engineer on construction for the Detroit & Bay City. In 1873 he was appointed Chief Engineer and Superintendent of the Chicago, Saginaw & Canada. In 1879 he resigned from this company to go with the Denver & Rio Grande as Resident Engineer. Mr. Bryant went with the Colorado Midland as Assistant Chief Engineer in 1886, was made Chief Engineer in 1887 and Chief Engineer of the Busk Tunnel Railway in 1890. The last named position was abolished in 1894, on the completion of the Busk Tunnel Line, but he held the position of General Superintendent of the Colorado Midland until the first of last month, when he was again made Chief Engineer.

—Mr. Frank S. Gannon recently resigned the office of Third Vice-President of the Southern Railway, to take effect Nov. 1. For some years he has had charge of the operating department of that company. Mr. Gannon was born at Spring Valley, Rockland County, N. Y., Sept. 16, 1851. He began railroad service in 1868 as a telegraph operator on the Delaware division of the Erie. Two years later he went to the New Jersey Midland, now the New York, Susquehanna & Western, where he remained five years, becoming train despatcher. He then went to the Long Island Railroad, where he remained until 1881, coming eventually to be trainmaster and master of transportation. He was a General Superintendent of the New York City & Northern for five years and of the Staten Island Rapid Transit Railroad from 1886 to 1894. He then became General Manager of the same road, and in 1896 went to the Southern. From 1890 to 1896 he was also superintendent of the New York division of the Baltimore & Ohio. Mr. Gannon is a man of physical and mental vigor and with his many years' of experience and undoubted ability as a railroad officer he will doubtless soon take another important position.

ELECTIONS AND APPOINTMENTS.

Atlanta, Knoxville & Northern.—See Louisville & Nashville.

Baltimore & Ohio.—E. L. Weisgerber, Master Mechanic at Baltimore, Md., has been assigned to other duties, and G. A. Schmoll has been appointed to succeed Mr. Weisgerber. E. A. Westcott, Master Car Builder at Newark, Ohio, has resigned, and that position has been abolished.

Boston & Maine.—A. S. Cheever, heretofore Assistant Chief Engineer, has been appointed Superintendent of the Fitchburg Division, with headquarters at Boston, Mass., succeeding F. O. Melcher, resigned, effective Nov. 1. (See Chicago, Rock Island & Pacific.)

Central of New Jersey.—E. E. Kerwin has been appointed Superintendent of the New Jersey Central and Lehigh & Susquehanna Divisions, with headquarters at Jersey City, N. J., succeeding M. M. Richey, Jr., resigned. (See Southern.)

Chicago & Eastern Illinois.—B. F. Yoakum (President of the St. Louis & San Francisco) has been elected Chairman of the Board, succeeding H. H. Porter, resigned. E. C. Henderson and H. H. Porter, Jr., have been elected Directors, succeeding J. G. English and G. Brewster, resigned.

Chicago, Rock Island & Pacific.—F. O. Melcher, heretofore Division Superintendent of the Boston & Maine, has been appointed Superintendent of the Illinois Division, with headquarters at Chicago, Ill., effective Nov. 6.

Cleveland, Cincinnati, Chicago & St. Louis.—G. H. Ingalls, heretofore Assistant General Freight Agent, has been appointed General Freight Agent.

H. Baldwin has been appointed Division Superintendent, with headquarters at Mattoon, Ill., succeeding W. M. Duane, resigned.

Colorado & Southern.—A. L. Cochrane has been appointed Acting Purchasing Agent, with headquarters at Denver, Colo., succeeding W. N. Schoff, resigned.

El Paso & Rock Island.—E. Maggard has been appointed Superintendent, with headquarters at El Paso, Texas.

Erie.—F. Tuma has been appointed Master Mechanic, with headquarters at Buffalo, N. Y., succeeding J. H. Moore, who becomes Master Mechanic at Rochester, N. Y., succeeding W. M. Perrine, who in turn becomes Assistant Master Mechanic at Port Jervis, succeeding Mr. Tuma, effective Nov. 1.

Great Northern.—The following appointments have been made: G. R. Martin, Auditor; F. E. Draper, Auditor of Disbursements; F. H. Parker, Auditor of Freight Receipts; C. W. Tilton, Acting Auditor of Passenger Receipts; J. A. Sandberg, Assistant Auditor of Disbursements, and C. S. Sikes, Assistant Auditor of Freight Receipts.

A. E. Long has been appointed Division Superintendent, with headquarters at Havre, Mont., succeeding W. D. Scott. W. R. Smith has been appointed to succeed Mr. Long as Assistant Division Superintendent at Kalispell, Mont.

Jamestown, Chautauqua & Lake Erie.—We are informed that the reports that D. J. Bill has resigned as General Freight and Passenger Agent of this company are entirely without foundation.

Lehigh Valley.—E. T. James has been appointed Master Mechanic, with headquarters at Buffalo, N. Y., succeeding G. W. Seidel, resigned. F. F. Gaines succeeds Mr. James as Master Mechanic at Wilkesbarre, Pa.

Louisville & Nashville.—Samuel Callaway has been appointed Superintendent of the Owensboro and Nashville Division, succeeding C. W. Bradshaw, who has become Superintendent of the Atlanta, Knoxville & Northern at Knoxville. The A. K. & N. will be known as the Knoxville Division of the L. & N. J. P. Harrison has been appointed Assistant Purchasing Agent, with headquarters at Louisville, Ky.

New York Central & Hudson River.—Francis Boardman, heretofore Assistant Engineer, has been appointed Supervisor of Track, with headquarters at White Plains, N. Y.

Ira A. Place has been appointed General Attorney.

Ohio Central Lines.—H. E. Speaks, heretofore Trainmaster, has been appointed Division Superintendent, succeeding J. F. Angell. (See Zanesville & Western.)

Orange & Northwestern.—E. P. Clawson has been appointed Auditor, with headquarters at Orange, Texas. The position of Traffic Manager has been abolished.

Pennsylvania.—E. J. Cleave, heretofore Principal Assistant Engineer of the Pennsylvania R. R. Division at Altoona, has been appointed Division Superintendent at Cresson, Pa., succeeding J. B. Baker, Jr., transferred. Mr. Cleave is succeeded by J. K. Johnston, who in turn is succeeded by George H. Brown as Assistant Engineer at Harrisburg, Pa.

See West Jersey & Seashore.

Queen Anne's.—Wm. D. Uhler, heretofore General Freight and Passenger Agent, has been appointed General Manager, succeeding I. W. Troxel.

Southern.—F. S. Gannon having resigned as Third Vice-President, effective Nov. 1, the General Manager of the Eastern and Western Districts will report to Second Vice-President W. W. Finley. Edward H. Barnes has been appointed Superintendent of Terminals, with headquarters at Jacksonville, Fla. E. C. Long becomes General Agent at Jacksonville, Fla.

M. M. Richey, Jr., heretofore Division Superintendent of the Central of New Jersey, has been appointed Superintendent of the Southern, with headquarters at Birmingham, Ala., succeeding C. S. Hayden, resigned.

Union Pacific.—Horace G. Burt (President) will assume the duties of General Manager also.

Washington County.—The officers of this company are: President, L. F. Loree; Secretary, C. W. Woolford; Treasurer, J. V. McNeal, and Auditor, J. L. Kirk.

West Jersey & Seashore.—D. H. Lovell, heretofore Division Superintendent of the Pennsylvania, has been appointed Superintendent of the W. J. & S., with headquarters at Camden, N. J., succeeding the late Mr. Dayton.

Zanesville & Western.—The officers of this company are: N. Monsarrat, President; J. H. Hoyt, Vice-President and General Counsel; F. B. Sheldon, Assistant to President and Chief Engineer; W. N. Cott, Secretary and Treasurer; L. P. Ecker, Auditor; C. B. Duffy, Purchasing Agent; H. B. Dunham, General Freight Agent; W. H. Fisher, General Passenger Agent; M. S. Connors, General Superintendent; S. S. Stiffey, Superintendent of Motive Power, and J. F. Angell, Superintendent.

RAILROAD CONSTRUCTION.

New Incorporations, Surveys, Etc.

ALBERTA ROADS.—Application will be made to the Dominion Parliament at its next session for a charter to incorporate a company to build from Macleod, Alberta, N. W. T., by way of Stand Off and Cardston to the International boundary, with the power to connect with lines in the United States. The projected distance is about 50 miles.

BIG TIMBER & COOKE CITY (MONT.).—Surveys are now reported completed for the projected line between these points in Montana. The route lies along the main Boulder River from Big Timber to Hicks Park, up the east fork of the Boulder to its head waters, down Slough Creek about eight miles, and thence up Lake Abundance Creek to Cooke City. The distance is a trifle under 70 miles. (Oct. 31, p. 845.)

BLACK BUTTE RAILROAD & COAL.—This company has been incorporated in Oregon by Thomas Quaid, E. H. Mattison and Henry Blackman to build a railroad in connection with coal properties. Further details are not at the present time available.

CAPE FEAR TERMINAL.—A deed of trust was filed at Southport, N. C., Oct. 24, to the amount of $800,000, for the Cape Fear Terminal Co. The Lincoln Saving & Trust Co., of Philadelphia, is trustee. The company is chartered to build between Wilmington and Southport, N. C., a distance of 30 miles, with the ultimate intention of extending or making traffic arrangements to reach the Virginia coal fields. Contracts were reported let last May to the Southport Construction Co. (May 23, p. 385.)

COEUR D'ALENE & SPOKANE (ELECTRIC).—This company has been organized at Spokane, Wash., to build between the points named, a distance of about 35 miles, paralleling the Northern Pacific. The road, according to reports, is to be built and operated by Coeur d'Alene, Idaho, lumber men. The directors are F. A. Blackwell, representing the Howard Lumber Co. of Williamsport, Pa.; Wm. Dollar, President of the Exchange National Bank, Coeur d'Alene, Idaho; A. Bettes, Detroit, Mich.;

C. P. Lindsley, of the Lindsley Bros. Co., of Menominee, Chicago and other cities, and F. S. Robbins, of the Robbins Lumber Co., Rhinelander, Wis.

Durham & Charlotte.—An officer is quoted as saying that this line, which is now being worked between Gulf and Star, N. C., 34 miles, will be extended from Gulf to Pittsboro, Bynums and Burlington to Greensboro, a distance of about 70 miles. An extension is now building also from Star to Troy, at the other end of the line.

Elliston & Southern.—According to most recent reports, the section of the line between Elliston, Mont., and the Beatrice mines, five miles, will be completed this fall, and next spring the company will build into Elliston. At present it is operated from a junction with the Northern Pacific, 1½ miles east of Elliston. B. Edgar, of Helena, Mont., is General Manager. (Aug. 15, p. 650.)

Evansville, Suburban & Newburgh.—Surveys are reported for extension of this light line from Newburgh to Rockport, Ind., 23 miles, running through Warwick and Spencer Counties. The company intends to work the extension like the rest of the line with steam at first, with the probability of converting it into an electric line later. The road is now in operation between Evansville and Newburgh, 11 miles.

International Bridge & Terminal.—This company filed articles of incorporation in Minnesota Oct. 29, with the purpose of building railroads in Itasca County, and a bridge over the Rainy River from Itasca County into Canada. Washington Gray, A. A. Avery, Edward L. Hollingsworth and others, of Minneapolis, Minn., are the incorporators.

Joliet & Western.—A trust deed for $10,000,000 was filed Oct. 30 in favor of the Royal Trust Co. in Illinois, to secure 50-year 5 per cent. gold bonds for purposes of building the line. It was incorporated to build from Joliet to Morris, Aurora, Sandwich, Plano and Newark, a total of about 65 miles. W. R. Newton and E. H. Young, of Yorkville, Ill., and others, are interested. (Oct. 17, p. 805).

Lake Erie & Detroit River.—Surveys have been begun at St. Thomas, Ont., easterly, and from Niagara Falls westerly, for an extension between these points, about 120 miles, and it is said that building will be begun next spring. The Lake Erie & Detroit River last August made a traffic arrangement with the Pere Marquette which has considerably increased the business of the road. (Aug. 8, p. 632.)

Louisville & Nashville.—Surveys are reported for a branch line from Pennington Gap, Va., through coal regions of Virginia into the Kentucky mountains.

Manitoulin & North Shore.—Surveys for this new line in Canada between Whitefish River and Little Current, Ont., have been completed. It is understood that the line has been located definitely from a connection with the Canadian Pacific to Little Current, and that contracts will be let at once. The distance from Little Current to Sudbury, on the Canadian Pacific, is about 66 miles. T. J. Kennedy is General Superintendent, and may be addressed at Sault Ste. Marie.

Maryville-Walland (Tenn.).—The new line between these points in Tennessee, 12 miles distant, has been opened and two trains are being run over it daily. It was built by the Little River Lumber Co. (Sept. 19, p. 734.)

Mexican Central.—See also under Railroad News.

Monticello, Fallsburg & White Lake.—The New York R. R. Commission has authorized this company to issue a first mortgage for $350,000 to secure funds for building. It was originally intended that the seven-mile strip between Fallsburg and Monticello, N. Y., should be opened in August, and work was reported in progress during July on a 13-mile section between Monticello and White Lake. The road is to be built so that it can be operated either by steam or electricity.

Nashville, Chattanooga & St. Louis.—Surveys are reported completed for a line from Clouse Hill, Tenn., into coal fields at Lumley's Bridge, a distance of about six miles.

Northern Pacific.—Contract for the projected cut-off from the terminus of the Central Washington branch at Grand Coulee, Wash., to Adrian, on the Great Northern, 20 miles, has been let to Larson & Foley, of Spokane, Wash. The contract stipulates that the road must be completed within six months. The projected line will cut off 150 miles of the haul to the coast. (Aug. 15, p. 650.)

Omaha-Funk.—Articles of incorporation have been filed in Nebraska for a line to run from Omaha through Douglas, Sarpy, Lancaster, Saunders, Butler, Seward, York, Polk, Hamilton, Adams and other counties to Funk. The total projected distance is approximately 215 miles. The incorporators are O. Erickson, E. L. Clark and others.

Oregon Roads (Electric).—Contract has been let to Winters, Parsons & Boomer to build an electric line 20 miles long from Portland, Ore. The name of the other terminal is not stated, but it is understood that the line will chiefly do a suburban business.

Pennsylvania.—Bids have been asked for double tracking the Petersburg branch from Petersburg to Hollidaysburg, Pa., a distance of about 30 miles. This work is in connection with the new Portage branch which is to be built from Hollidaysburg to Cresson Springs and Gallitzen, between 10 and 15 miles additional. Bids for the Portage branch were asked for early in October. When it is completed, considerable of the freight which now passes over the main line can be diverted to this route and in this way the present congestion in the yards at Altoona will be relieved. (Oct. 10, p. 786.)

The Wolf Creek branch between Leesburg and coal and limestone fields in Butler County, Pa., 12 miles, has been opened for business and heavy shipments are reported. Work on the line involves three bridges and a number of deep cuts and heavy fills.

St. Louis & East Shore.—Articles of incorporation were filed in Illinois Oct. 25 for a line from East St. Louis directly across Illinois to Shawneetown on the Ohio River. The projected distance is about 125 miles in a direct line.

Sherman-Waco (Electric).—An officer of the company organized to build a double track electric line between these points in Texas, 170 miles apart, is quoted as saying that incorporation will be made at once, with a capital of $3,000,000. The projected line is to pass through Dallas, Waxahachie, Ennis and Corsicana, and will parallel the Houston & Texas Central for the greater part of its distance. The portion from Dallas to Waxahachie is to be built first, and it is expected that it will be completed in eight months. J. A. Farnham, Fort Worth, Texas, is General Manager.

Souderton, Skippack & Fairview Electric.—Charter for this company was placed on record at Norristown, Pa., Oct. 25. It is proposed to build for the present from Souderton, on the North Penn R. R., to Trooper, on the Schuylkill Valley Traction line by way of Franconia, Skippack and other towns which are at present without railroad facilities. The company was formed last June, and E. S. Moser, of Collegeville, Pa., is President. (June 27, p. 520.)

Southern Pacific.—An officer writes that the company will build a branch line to Imperial, Cal. Imperial is a small town in San Diego County, 23 miles southwest of the Flowing Wells station on the main line. The report that certain portions of the main line track west of Yuma, Ariz., would be abandoned after this extension was completed, is entirely unfounded.

Sycamore Railway & Improvement.—An officer writes that this company, which filed articles of incorporation in Nebraska Oct. 25, intends to build from Auburn, Neb., to Topeka, Kan., and from Falls City, Neb., to St. Joseph, Mo. F. C. Wiser, Falls City, Neb., is President, and A. E. Gantt is General Manager. (Oct. 10, p. 786.)

Trans-Canada.—According to most recent advices, a line has been surveyed from Roberval, Que., in the direction of Moose Factory, and 60 miles of this has been cleared. Moose Factory is about 380 miles from Roberval and contract for this portion of the work was reported let several weeks ago to Colonel G. E. Church, of London, Eng. The ultimate intentions of the company call for a line from Port Simpson, on the Pacific coast, to either Chicoutimi or Quebec. Application was made to Parliament last spring to grant running powers over the Quebec & Lake St. John road between Roberval and Quebec. R. Gardiner, Secretary of the Executive Committee, Quebec, may be addressed. (Oct. 24, p. 826.)

Tremont & Gulf.—An officer writes that this line projected from Tremont, La., south to a point near Eros, in Jackson Parish, 15 miles, is almost completed as far as it will be built at present. Contracts are already let and rails and rolling stock have been bought. Tremont is on the line of the Vicksburg, Shreveport & Pacific. Robert H. Jenks, Tremont, La., may be addressed.

Victoria, Vancouver & Eastern.—At a meeting of the Railway Committee at Ottawa, Oct. 28, this company was given permission to build a branch line to Columbia and Grand Forks, B. C., and to run a five-mile branch to the Granby smelter. Its proposed crossing of the Grand Forks and Kettle River line was also approved.

Wabash.—An officer denies that the Wabash is interested in the proposed line from Washington to Waynesburg, Pa., 20 miles. (Oct. 17, p. 806.)

Waukegan & Western.—Incorporation of this company in Illinois has been licensed. It is proposed to build a railroad in Lake County, with office at Waukegan. The incorporators and first board of directors are Wm. H. Dodge, Clarence A. Murray and others, of Waukegan, Ill.

White River.—See under St. Louis, Iron Mountain & Southern, Railroad News.

GENERAL RAILROAD NEWS.

Atchison, Topeka & Santa Fe.—At a meeting of the shareholders Dec. 11, a vote will be taken on the proposition to confirm the purchase of the Santa Fe Pacific, all the stock and bonds of which are now owned by the Atchison, Topeka & Santa Fe; of the Eastern Oklahoma; Iowa, Chickasha & Fort Smith; Guthrie & Western and Eastern of New Mexico Railroads. Of these companies, the first three were organized to build the extensive system of new lines in Oklahoma referred to in the annual report last year and the year previous, and they are now engaged in building over 300 miles of road. The shareholders will also be asked to ratify purchase of other railroads which have been purchased under authority of the board of directors.

California & Nevada.—Sale of this road, which runs from Oakland, Cal., to Bryants, 42 miles, and is 3-ft. gage, was ordered some time ago by the United States Circuit Court at Oakland, Cal., and will take place on Nov. 29 in Alameda County, Cal. The upset price is $40,000. A receiver was appointed in May, 1896, in a suit to foreclose $500,000 of bonds.

Chicago & North Western.—The consolidated 7 per cent. gold bonds which mature Dec. 1, and amount to $7,296,000, will be paid on and after that date out of funds derived from the proceeds of the sale of 3½ per cent. general mortgage gold bonds. An issue of $20,000,000 of these was sold to Kuhn, Loeb & Co. in 1897 to provide for bonds up to and during the present year.

Cincinnati, Richmond & Muncie.—Press reports state that a traffic arrangement has been made with the Pere Marquette which will permit this company to gain entrance into Milwaukee. It is understood that the Cincinnati, Richmond & Muncie will be completed by the first part of next year, as practically all that remains to be done is a long piece of bridging and trestle work in connection with the entrance into Cincinnati.

Cuban R. R. Co.—The Railroad Commission at Havana has authorized the registration of this company, with a capital of $20,000,000, to take over the work and property of the former Cuba Company which built the line from Santa Clara to St. Luis and Santiago. It is thought that the line will be opened some time in November.

Georgia Southern & Florida.—The mortgage recently made to the New York Security & Trust Co. calls for $10,000,000 to secure an equal amount of consolidated bonds. Approximately half of the issue is to be applied to the retirement of the old first mortgage bonds and the first preferred stock of the Georgia Southern road. About $2,000,000 of the bonds, it is said, will be used in paying for the Atlantic, Valdosta & Western recently acquired.

Grand Trunk.—Purchase of the site of the old Parliament buildings in Toronto is reported in the interest of this company. The use to which the tract is to be put has not been stated, but it is commonly thought that it is intended as a site for a new freight yard, since the company is greatly crowded in its present accommodations. (See also under Other Structures.)

Houston & Texas Central.—Notice is given that the company has in its possession cash proceeds from sales of land covered by trust indenture between Frederick P. Olcott, the Central Trust Co. of New York, and the Southern Pacific Co., dated 1890, which are applicable to purchase of the Houston & Texas Central first mortgage bonds. Cash proceeds from sales covered by trust indenture between Olcott, the Southern Pacific Co., and the Farmers Loan & Trust Co. of New York, are also held which are applicable to the Houston & Texas Central consolidated mortgage bonds. It having been found that neither of these classes of bonds can be purchased at or below 110, 150 of the first mortgage bonds have been drawn by lot for redemption, and 85 of the consolidated mortgage bonds, and these bonds will be paid for at 110 plus accrued interest, and will cease to bear interest from and after the 31st day of December, 1902.

Interborough Rapid Transit.—The *Wall Street Journal* says that this company will control the Rapid Transit lines extending from Flatbush avenue, in Brooklyn, where connection is made with the Long Island Road, to the Battery at New York, thence to Bronx Park on the east, and to Kingsbridge on the west side, covering about 60 miles of track divided into sections as follows: From City Hall, Manhattan, by way of Union Square and Forty-second street, to 104th street, seven miles; four-track, from 104th street east under Central Park and thence north to the Harlem River at 140th street, following the general course of the Southern Boulevard to Bronx Park, seven miles; double track, with an additional track over the viaduct at 149th street and Westchester avenue: from 104th street to Kingsbridge, seven miles; double track, with an additional track over the viaduct at Hillside avenue: from City Hall, Manhattan, down Broadway to South Ferry, under the East River and under Brooklyn Heights to Flatbush avenue, four miles. These lines will be operated by electricity under a 60-year franchise exempt from taxation. Payment, however, of 3½ per cent. per annum on approximately $37,000,000 to the city is a fixed charge, and a sinking fund of 1 per cent. is to be established five years after the road is put in operation. The larger part of the capital required to build the Brooklyn extension has been furnished by the Interborough Co. The work of excavation, steel frame and concrete work is expected to be finished by the close of the present year, and track laying and station building will be under way early next year, when it is expected that the main section will be opened for traffic. Arrangements have been made for 58 stations, of which at present five are planned as express stations located at City Hall, Fourteenth street, Forty-second street, Seventy-second street and Ninety-sixth street. The capital consists of $35,000,000 common stock.

Mexican Central.—It is understood that purchase of the Mexico, Cuernavaca & Pacific line has been arranged by the above. In accordance with the provided terms, the Mexican Central acquires the property free from encumbrances by paying its outstanding liabilities to London and the National banks, the Government at present being the guarantor for its liabilities, which approximate $4,500,000 silver. The Mexico, Cuernavaca & Pacific is in operation between the City of Mexico and Rio Balsas, a distance of 181 miles, connecting with the Mexican Central at the City of Mexico. J. H. Hampson is President and General Manager. In connection with the transfer, the Government has granted to the Mexican Central an amended concession empowering it to build either to Acapulco or to Zihuatanejo, as surveys made indicate.

New York, New Haven & Hartford.—Most recent advices in regard to the steamship service which is to be organized to carry freight from the company's docks at Boston to Antwerp and Manchester, state that the service will begin early in January and will be conducted with the ships of the International Mercantile Marine Co. The exact time when the service will begin is dependent upon alterations which are now being made to the docks.

Norfolk & Western.—The statement for the three months ending Sept. 30 show gross earnings of $5,016,362 as against $4,231,432 last year. This, however, is on a mileage increased by 35. Total expenses for the current period were $2,923,858 as against $2,443,009, leaving net earnings of $2,092,504 as against $1,788,423 and a surplus of $1,458,344, an increase of $246,405 over the figure for last year.

Pittsburgh, Lisbon & Western.—Press despatches state that a deed has been filed for transfer of the Salem R. R., running between Salem and Washingtonville, Ohio, seven miles, to the above company. The Pittsburgh, Lisbon & Western proposes to build an electric system in Ohio and Pennsylvania, and has recently increased its capital stock from $1,000,000 to $5,000,000. The price reported paid for the Salem road was $142,580. (See under Railroad Construction, Oct. 31, p. 846.)

St. John's River Terminal (Southern).—A mortgage has been filed to the New York Security & Trust Co., as trustee, to secure $2,000,000 first mortgage 50-year bonds, covering terminal property at Jacksonville, Fla.

St. Louis, Iron Mountain & Southern (Missouri Pacific).—At a meeting of the shareholders Dec. 29, a vote will be taken on the proposition to increase the bonded debt by an issue of $10,000,000 of bonds for the purpose of purchase of the railroad property and franchises of the White River R. R. The increase in bonds involves a similar increase in authorized capital stock which will total $90,000,000. The White River, which was incorporated in February, 1901, is building from Batesville, Independence County, Ark., to Buffalo City, 82 miles, and intends to build also from Buffalo City to some point in Arkansas, making a total of about 175 miles of main line. The first 82 miles of the road is nearing completion.

South Shore.—Suit was instituted at Montreal on Oct. 23 at the instance of Alfred Schiffer, of New York, requiring Hiram A. Hodge, of Rutland, Vt.; Wm. Seward Webb, of New York, and Percival Clement, of Rutland, to show title by which they act as directors and officers of the South Shore R. R. The suit has been undertaken with a view to settling the disputed ownership of the road, there being at present two opposition boards of directors in existence.

Toledo & Indiana (Electric).—This company has filed a mortgage to the Security Trust Co., of Toledo, as trustee, to secure $1,650,000 5 per cent. 26-year gold bonds. The proceeds of the issue are to be applied to the building of the road which is now in progress between Toledo and Wauseon, in Fulton County. A proposition has been made to the Toledo Railways & Light Co. to obtain trackage rights into Toledo, and this will be taken up at a meeting of their shareholders Nov. 7.